AUGUST 29, 1955

STEEL

The Metalworking Weekly

MACHINE TOOL SHOW ISSUE

Metalworking's growing requirements will boost machine tool business 50 per cent in next ten years . . . . . page 125

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Here Is Extra Motor Value

Double-shielded bearing
Large grease reservoirs
Bolted-on bearing cap
Labyrinth seals

This Allis-Chalmers Bearing Design Gives More for Your Motor Dollar

You can lubricate these bearings without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and relieving pressure during re-greasing.

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6210.

A-4617

ALLIS-CHALMERS

Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

2 Fine Tool Steels Team Up to Make Compound Die

This compound blanking, forming and piercing die is used by National Motor Bearing Co., Redwood City, Calif., in the production of cup cases for oil seals. The die is made up of two grades of Bethlehem tool steel: BTR and Lehigh H.

Hardened to Rockwell C 60-61, the long-wearing die forms the cup cases from plain carbon steel, stainless steel, and brass sheets. They range in diameter from ½ in. to 14 in., and in thickness from 0.030 in. to 0.090 in. The die produces parts to tolerances of plus or minus 0.002 in., and produces up to 75,000 pieces before slight redressing is required.

BTR (Bethlehem Tool Room) is our general-purpose, manganese-chromium-tungsten grade of oil-hardening tool steel. Its main feature is its safe-hardening property. This, coupled with its sound combination of wear-resistance and toughness, makes BTR an ideal steel for all general-purpose tool and die applications.

Lehigh H is a high-carbon, high-chromium tool steel. It offers maximum wear and minimum distortion in heat-treatment. It is also a deep-hardening steel, in air, and thus has high compressive strength.

Your tool steel distributor will be pleased to furnish additional information about these fine Bethlehem tool steels. He'll welcome your call, right now.

BETHLEHEM TOOL STEEL ENGINEER SAYS

Why and How to Stress-Relieve Tools

Stress-relieving is performed on tools to partially remove residual stresses resulting from machine work, mechanical straightening, hobbing, or other cold working. The reduction of stress is important in avoiding excessive distortion during tool hardening, as well as in avoiding the cracking that results from the addition of residual stress to the thermal stress produced when heating to the hardening temperature.

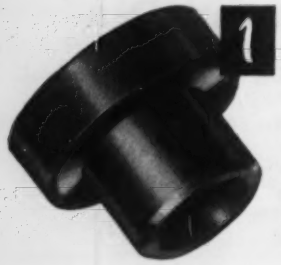
Stress-relieving is accomplished by heating the steel to from 1100 to 1300 F. Because of the relatively low temperature, surface protection against scale or decarburization is usually not required. As the temperature used is always below the transformation range of the steel, the rate of cooling is unimportant, except that it must not introduce thermal stress during cooling. Only a portion of residual stress is removed by this procedure. Up to the lower critical, the higher the stress-relieving temperature, the more completely is the stress removed.

The degree of stress-relief afforded in this manner is usually sufficient. However, if complete relief of stress is required, a full anneal practice should be employed, including full austenitization and slow furnace-cooling.

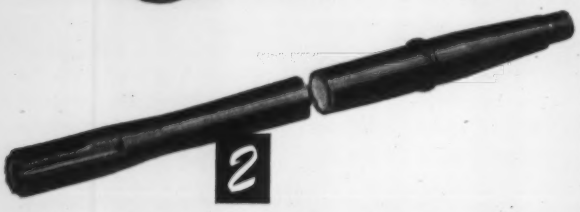
TUBE MANDREL FOR SERVICE IN EXTRUSION PLANT

Shown during a finishing cut, this tube mandrel will see service in the extrusion plant of Kaiser Aluminum & Chemical Corp., Halethorpe, Md. The mandrel is made of Bethlehem Cr-Mo-W (chrome-moly-tungsten) tool steel. Cr-Mo-W is an all-around hot-work steel containing 5 pct chromium. It is especially suited for jobs that involve shock and drastic temperature changes, as well as for jobs where heat-checking is a problem.

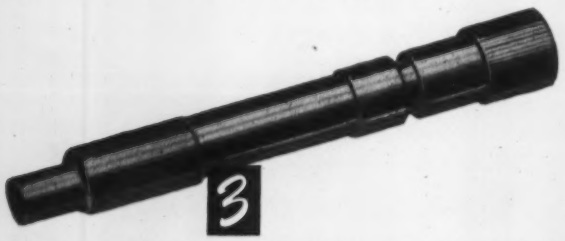
7 WAYS to SAVE MONEY with TOCCO* Induction Hardening



Cost was reduced 94% when heat-treatment of this corn-harvester part was changed from carburizing to TOCCO-hardening, 9½c saved on every piece — $47.50 on each 50,000 piece batch, plus an hourly production increase from 120 to 300 pieces per hour.



Leading automotive companies need and use TOCCO hardened axle shafts to handle higher horsepower. Better, yet cheaper—savings of $375.00 per day. Less machining costs, lower priced material, increased production, and a plus in quality—200% greater torsional life.



Kearney & Trecker Corp. reduced the cost of hardening this milling machine part from $1.57 to 10c apiece. In addition TOCCO made possible a switch from alloy to S.A.E. 1045 steel—saving another 11c per piece in material cost. Kearney & Trecker hardens 140 different parts on one TOCCO unit.

Thompson Products Ltd. boosted production of these automotive wrist pins from 500 to 1200 per hour when they switched to TOCCO-hardening. Costs fell from $5.45 to $3.25 per hundred parts—a savings of 2c per pin, $26.40 per production hour.

Mechanics Universal Joint Division of Borg-Warner reports a 69% savings in the hardening of stub ends for propeller shafts. TOCCO also upped production from 35 to 112 parts per hour—over three times as fast as conventional heating methods.

Lima-Hamilton Corporation adopted TOCCO for hardening this shifting lever. Results: a savings of 4c per piece—$25 per production hour. TOCCO costs only 17% of former heating method. This is only 1 of 139 parts TOCCO-hardened by Lima-Hamilton Corp. All show savings over usual heating methods.

7 Number 7—the lucky number—is up to you. Why not add your name to the list of companies who use TOCCO Induction Heating to increase production, improve products and lower costs. TOCCO engineers are ready to survey your plant for similar cost-saving results—without obligation, of course.

THE OHIO CRANKSHAFT COMPANY

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Mail Coupon Today

NEW FREE BULLETIN

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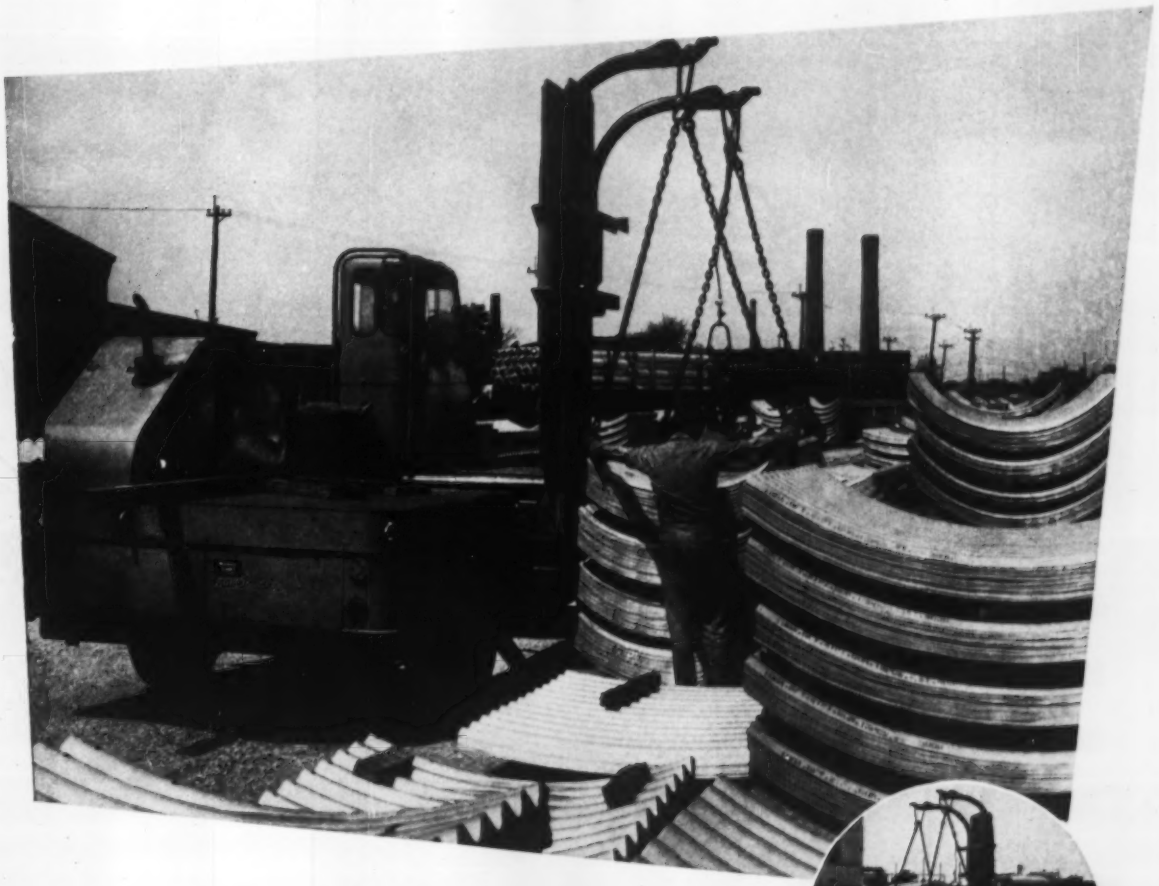
Dept. S-8, Cleveland 1, Ohio
Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name_____
Position_____
Company_____
Address_____
City_____ Zone____ State____



SIDE-LOADING Traveloader

DOES A JOB HERE

NO OTHER HANDLING MACHINE CAN DO

Traveloader easily picks up long, awkward loads from the side and carries them securely and speedily to near or distant points—without changing travel direction. This unusual feature enabled a large mid-western steel company to set up a highly efficient system for handling and yard-storing heavy curved corrugated steel plate sections.

Unit loads weighing up to 9,000 pounds are placed on the Traveloader by overhead crane at the fabricating department, transported to storage area and tiered along 12-foot aisles. As needed, sections are picked up by the Traveloader and delivered to the shipping platform. A special attachment permits handling of single sections or "split lifts."

As a direct result of this method the company uses yard space to much better advantage, fills orders faster and substantially reduces handling manpower.

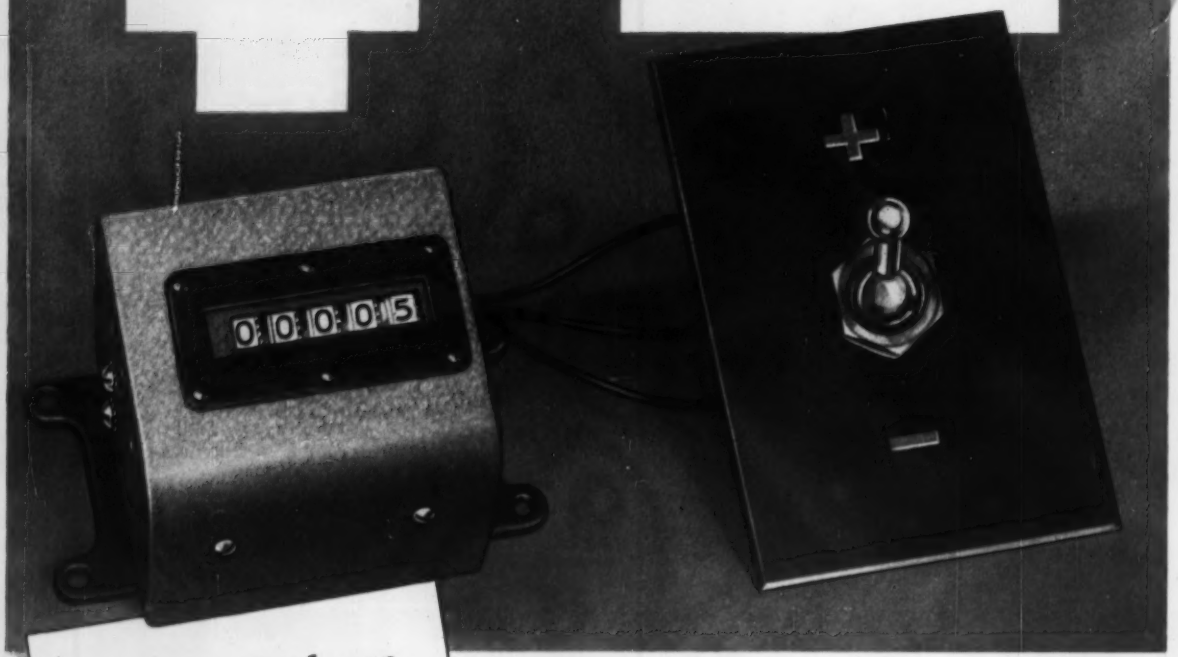
The Traveloader also handles pipe, lumber, loads weighing over 4,000 pounds and any awkward loads. It does yard maintenance work, positions machinery and performs many other handling jobs not practical or possible with any other equipment.

Write for Bulletin 1360. It completely describes the remarkable TRAVELOADER that carries like a straddle truck, delivers like a road truck, and stacks like a fork truck. The Baker-Raulang Company, 1259 West 80th Street, Cleveland 2, Ohio.

Baker
HANDLING EQUIPMENT

This Magnetic Counter

Adds and Subtracts



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"The Name that Counts"

STEEL
The Metalworking Weekly

AUGUST 29, 1955
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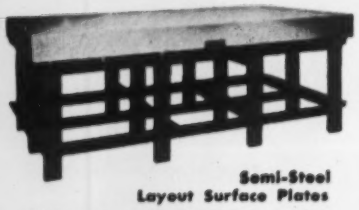

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THE CHALLENGE MACHINERY CO.
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behind the scenes

Huber Rates Hubba Hubba

When Machine Tool Editor Robert Huber dreamed up the idea for the cover you saw a moment ago, he rushed out to the Warner & Swasey Co. to borrow a photograph illustrating his thought. These excellent people, who have designed and produced such widely separate things as automatic machine tools, observatory telescopes, radar equipment, textile machinery and earth moving devices, didn't have the exact print required —so they made a photograph right down to specifications.

The cover that this photograph graces advertises this year's Machine Tool Show at the International Amphitheatre and the Production Engineering Show at Navy Pier, Chicago. Your Machine Tool show badge will admit you to both. More than 90 per cent of the country's leading machine tool builders will be on hand.

Inspired by the cover design, Robert wrote the article appearing on page 126. He calls it "Machine Tool Industry Looks Ahead," and you are cordially invited to look it over. Its facts and figures will fascinate you. A 1955 car, for instance, would cost $50,000 to build today using 1925 methods! He notes that this year's Machine Tool Show is designed to prove that yesterday's machines are already obsolete—and that any competitive, progressive plant that delays buying the best equipment for its operations, first ceases to be progressive. Then it ceases to be competitive. (And then, presumably, it ceases.)

Ding Dong Bell

Oct. 11 is General Pulaski's Memorial Day and the first day of National Posture Week. By an unusual coincidence, the Detroit section of the Association of Iron and Steel Engineers has selected that date to invite STEEL's Assistant Managing Editor Vance Bell to appear before them and tell all about steel expansion during the next 15 years. When Vance pulls himself erect before that distinguished audience and prepares to declaim in ringing tones what's what in the steel industry, he won't just be beating his gums; he will have enough information at his command to keep going for a week, instead of merely an hour. You see, aside from being an expert on metals and markets, Vance has authored an article for the Sept. 5 number of STEEL. It is a comprehensive and analytical discussion of steel expansion plans during the next 15 years.

Soviet Vs. Lowlander

Jack Crump, STEEL's European manager in London, promotes amateur athletics as an avocation. He is so well known in the sporting world it comes generally as a surprise that he works as a publishing executive to keep himself in sweat shirts, peaked caps and coach whistles. On Sept. 7 Jack leaves with a party of 67 British athletes for International athletic matches in Moscow between Great Britain and Russia. It is the first time that a country from West Europe has ever been invited to match athletic wits and muscles with the Soviets, and we are looking forward to Jack's Russian report, which we will pass on to our few patient readers without delay.

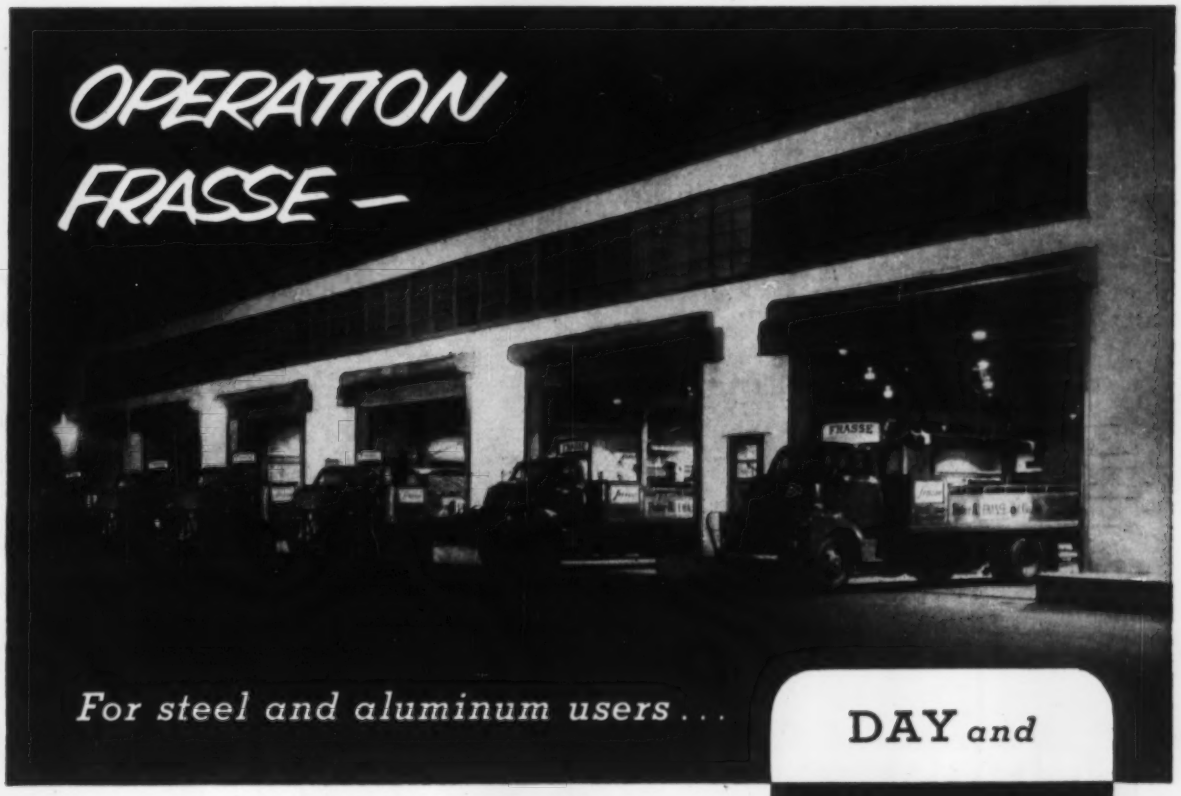
Scranton Match Equation

Franik Burjevsky's jzxcvbiop was 54½-in. long before it was exposed to the midnight sun. We thank Robert Stedfeld and Leo Spector for the puzzle *and* the answer. These two robust brains are associate editors of *Machine Design*, sister publication of STEEL, and they can run up and down slide rules like squirrels. When they declared the answer was 54½-in. we accepted it at face value for two reasons: Each used a different method and arrived at the same answer; we used eight different methods, and came up with nothing but the address of a meat cutter in Scranton. He was the man who used to say: "Correct this false equation by altering the position of only one match:

$$\frac{\text{XXII}}{\text{VIII}} = \text{II}$$

Shrdlu

(Metalworking Outlook—Page 91)



While you sleep, loading operations are underway . . . before you awaken modern Frasse trucks are rolling with material you ordered hours ago.

This fast, on-the-ball delivery is typical of the handling your orders receive when you do business with Frasse. Thousands of firms know this service is *routine* . . . and depend on quick, sure delivery from Frasse to keep production lines producing.

Frasse stocks *all* of the popular grades, shapes and sizes of stainless, alloy and carbon steels, tubing and aluminum . . . plus many specials, too. When you work from complete Frasse warehouse stocks you eliminate needless "shopping".

And, remember – Frasse engineers are always available to consult with you on problems involving steels, tubing and aluminum. Their services are free, and they can be consulted anytime – by mail, phone . . . or on the spot in your plant.

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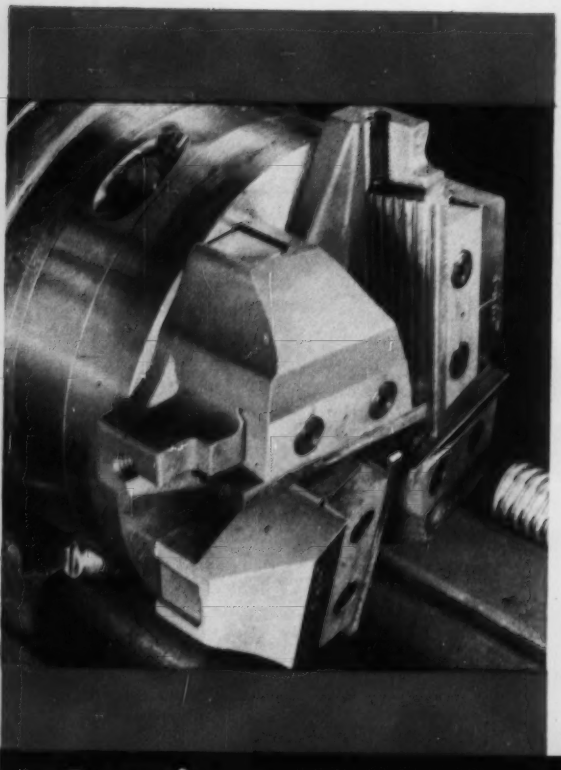
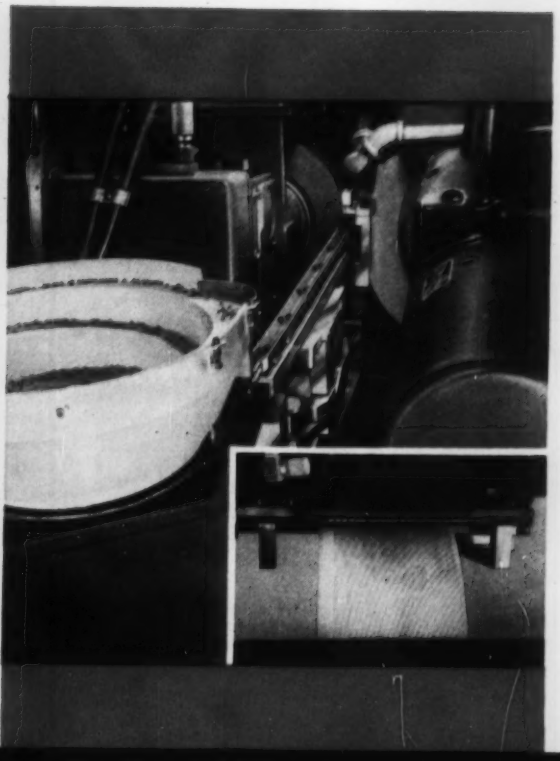
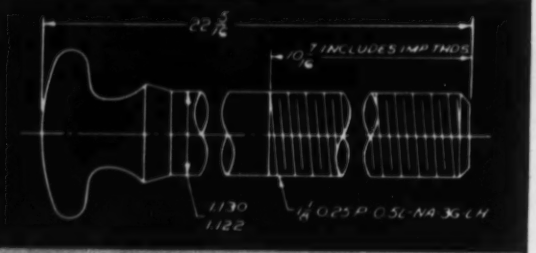




Cutting

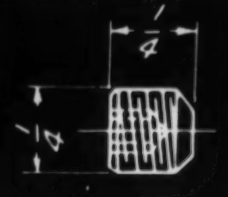
Workpiece:	**Valve Stem**
Thread Spec.:	
Diameter	1-1/8"
Length	10-7/16"
Type	1/4"P, 1/2" lead, double left-hand Acme
Tolerance	Class 3
Threading Time:	**24 sec.**



Threading is by the new 16C LANDMACO Single-Spindle Leadscrew Threading Machine fitted with 2" LANCO Heat-Treated Head using Roughing and Finishing Chasers with Centering Throats. This equipment is designed to produce a thread of excellent finish despite heavy metal removal, and eliminate the out-of-roundness common in long workpieces. Long life between grinds of the LANDIS Tangential Chasers for 80% of their length will hold tool cost to a minimum.

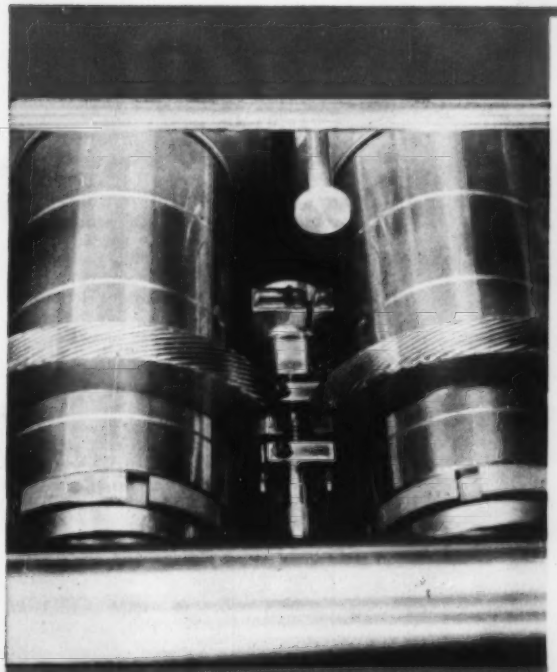
Grinding

Workpiece:	**Set Screw**
Thread Spec.:	
Diameter	1/4"
Thread length	1/4"
Type	20P-U.N.C.
Tolerance	Class 3
Production:	**7,500 pieces per hour**



Threading is performed by continuous thru-feed grinding on a #1 LANDIS Centerless Thread Grinder. Operation is automatic—blanks are fed by a vibratory hopper—finished pieces ejected into a tray. This operation indicates the mass production possibilities of the centerless thread grinding method. Infeed grinding may be used for many shouldered workpieces which may not be threaded satisfactorily by either Cutting or Rolling.

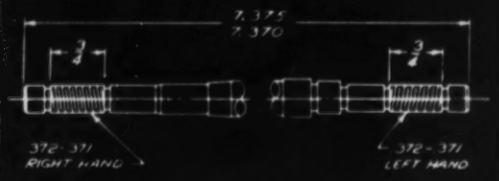
443-C



THE MACHINE TOOL SHOW
BOOTH 1406

Rolling

Workpiece:	Worm shaft (50 carbon alloy steel of 25 Rockwell C)
Thread Spec.:	
Diameter	3/8"
Length	3/4"
Type	Triple worm, .100" P, .300" lead
Tolerance	.003 concen. with main bearing journals
Production:	12 pieces per minute



Threading is done by infeed rolling with manual loading on the new LANHYROL Thread Rolling Machine. This operation illustrates the difficult threads which can be rolled. Automatic feeding is available for many operations—thrufeed rolling of Acme Threads on long bars also to be demonstrated.

CUTTING, GRINDING, AND ROLLING THREADS will be demonstrated on the most modern Threading Equipment. 3 of the more than 10 Threading Operations to be shown are illustrated. All of the Threading Machines featured in these operations will be on display for the first time: the LANHYROL Thread Rolling Machine, the Model C LANDMACO Threading Machines, and the #1 Automatic Close Nipple Machine. LANDIS Threading Tools—Die Heads, Collapsible Taps, and Thread Rolling Attachments—will also be shown. Experienced LANDIS Engineers will be glad to help with any problem dealing with method, equipment, or thread design.

LANDIS *Machine* COMPANY
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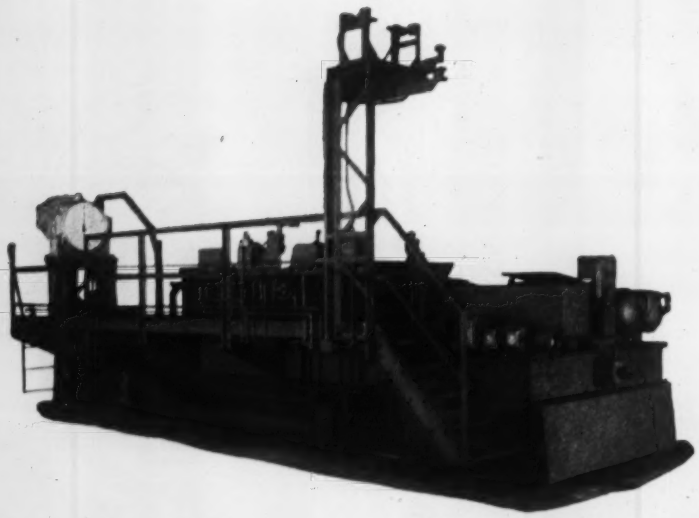
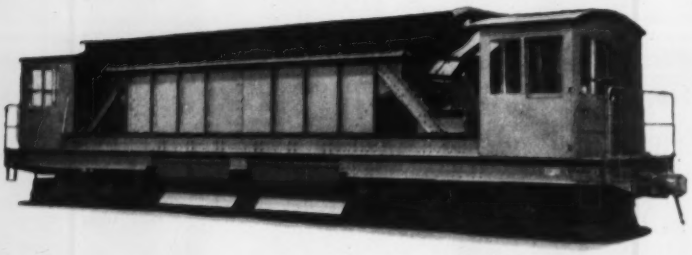
HERE'S *built-in* STAMINA

that spells DEPENDABILITY

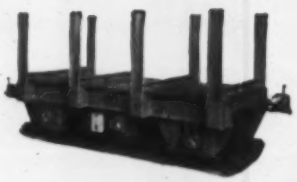


10-TON SCALE CAR, SINGLE HOPPER, BOTTOM DUMP



75-TON ORE TRANSFER, GABLE BOTTOM, SIDE DUMP

Atlas "single-lever" Safety-Type transfers give outstanding short-haul service . . . such as between buildings, for cross-bay crane service, and movement in production. Powered to meet your operating needs . . . storage battery, diesel or gas-electric, or cable reel.



Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Pig Iron Price Change

Since the recent pig iron price increase of $2.50 per ton was announced, STEEL has shown the gross ton price of No. 2 foundry pig iron, Birmingham, as $55. Adding $2.50 to the old price of $52.88 would make $55.38, but STEEL quotes the price of $55. We would appreciate an explanation.

Louis E. Ward
Tennessee Copper Co.
New York

• *Before the price increase, producers in that district included a 38-cent phosphorus differential in their posted prices. Since they now are making lower phosphorus grades, this differential has been eliminated.*

A 43-Year Reader

STEEL has been my favorite periodical since 1912, a period which includes employment with three motorcar companies, a spring company, automobile supply firm and as purchasing agent, American Screen Products Co., Miami. Although semiretired, I will always be interested in STEEL.

O. J. Doepel
Manufacturers Representative
Venice, Fla.

Aluminum Export Protest

Your discussion on aluminum scrap exports in the July 11 Nonferrous Metals column (page 130) ignored the impact these exports are having on the steel and aluminum foundry industries.

The aluminum smelting industry has protested the rate of exports of aluminum scrap but received no concrete results through action of the government.

Alleged relief taken by the Bureau of Foreign Commerce in limiting scrap exports in the second quarter this year to 9000 tons constituted no relief since this was approximately the same rate as in 1954 when exports totaled 78.6 million lb.

Curtailing of third quarter licenses to 5000 tons is likewise no relief. Since licensees have 90 days from the quarter's expiration to complete shipments, probably 5000 to 6000 tons of second quarter licenses are overhanging the market for the third quarter. That means a possible third quarter export load of 20 million to 24 million lb.

The only weapon for curtailing these exports in the absence of sound government control lies in domestic producers paying sufficiently high prices to deter the foreign buyer. This causes the prices of aluminum ingot and deoxidizing shapes to rise, penalizing the foundries using the ingot and the steel mills using

(Please turn to page 12)

Set Your Sights on Greater Productivity

ZERO IN ON BOOTH 920

Sept. 6-17

at the Machine Tool Show

See Many of these Monarch Lathes in Action

TOOLMAKER'S LATHES
in a complete range of sizes

ENGINE LATHES
in a complete range of sizes

THE MONA-MATICS
for high production metal turning

THE HYDRA-SLIDE
for high production chucking and fixture work

THE SPEEDI-MATIC
a fast, precision hand screw machine

MONARCH-KELLER TURNING MACHINE

THE MONARCH MOTOR-TRACE

THE MONARCH AIR-GAGE TRACER

THE MONARCH ROLL TURNING LATHES

THE MONARCH 60" RIGHT ANGLE LATHE

THE SHAPEMASTER ENGRAVER

PLUS - the *New* Monarchs— First Showing

Make your primary target the finest metal turning equipment ever produced—at the Monarch exhibit just inside the main entrance, first floor. See for yourself the great new strides Monarch has made to give you radically new standards of productivity.

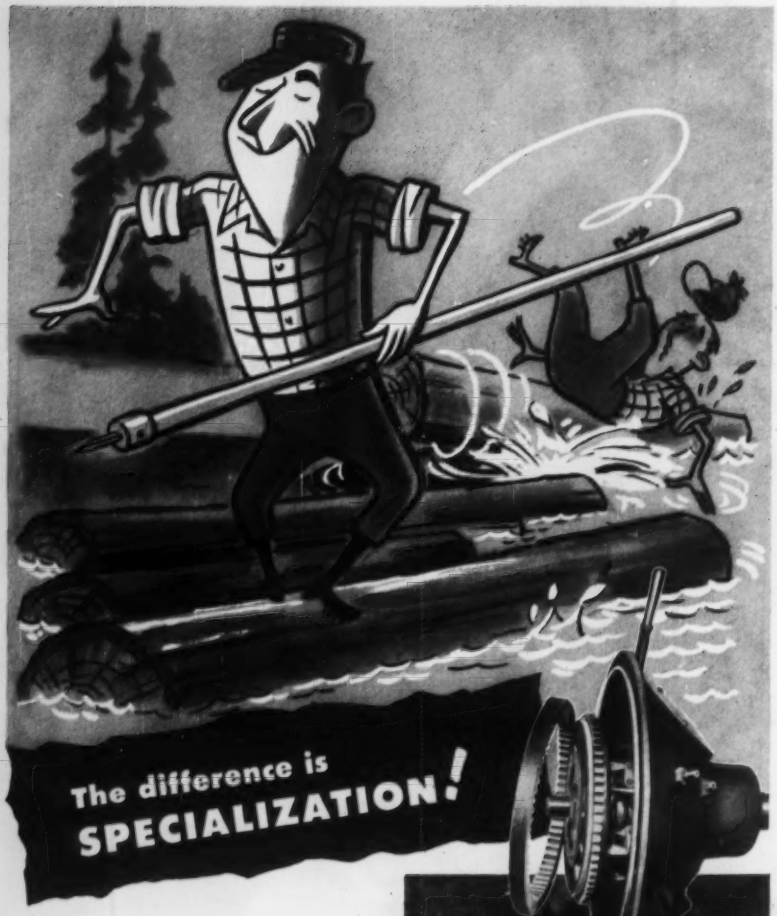
See the new Monarch Series 90 Dyna-Shift Lathes in action—the Series 62 *Preselector* Dyna-Shift Lathes—the Hydra-Slide (for high production chucking and fixture work)—the fabulous Series EE Model 1000, with features making it the most versatile lathe of its capacity on the market. PLUS an array of completely new cost-cutting lathes to be presented for the first time at the show.

Plan to give us lots of time at Booth 920—for better business' sake! (It's a handy place to meet friends, too.) See you in Chicago! . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES



"Working logs" may *look* easy —but you're doomed for a soaking if you're not an experienced specialist.

Linking horsepower to industrial equipment may seem easy, too, *until the power linkage fails and costly downtime ties up your machine . . . or even breaks up your entire work cycle.*

That's why more and more powered equipment users specify Twin Disc power linkage—and why more and more powered equipment manufacturers *install Twin Disc power linkage as standard equipment.* Since 1918, Twin Disc has specialized exclusively in the design, manufacture and application of both Friction and Fluid Drives. As a result, Twin Disc provides exactly the *right* Drive for essentially all requirements of industrial power transmission.

This sawmill, powered by an International U-450 engine, gets faster production, smoother control, and longer life by driving through a Twin Disc Friction Power Take-Off. Capacities of Twin Disc Friction Drives range from fractional to 1325 hp; of Fluid Drives from ¾ to 850 hp.

TWIN DISC

TWIN DISC

Friction Clutches and Fluid Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa

LETTERS

(Concluded from page 10)

metallurgical shapes.

These are the results of the persistent refusals to scan this export problem, such as reflected by the testimony of the Bureau of Foreign Commerce before the House Small Business committee and the superficial treatment in your article which reflected the Bureau of Commerce statement that aluminum scrap exports took only about 1½-per cent of our total aluminum supply.

We have pointed out that scrap exports take 10 per cent of our scrap supply. This is the only sound appraisal of the magnitude. Our entire aluminum supply is not available to foundries and steel mills. Large quantities go into stock pile and, at best, only 6 to 8 per cent of the aluminum shipped into industry has ever gone as ingot for casting and steel mills.

Carl H. Burton
Secretary
Aluminum Smelters Research Institute
Chicago

• *Mr. Burton elaborated more on these points, but we do not have space for the complete letter. We will be glad to supply readers with a copy of it.*

What's Cooking?

We would appreciate the address of the Steel Kitchen Cabinet Manufacturers Association. It is mentioned in the article, "What Cooks in Kitchens?" (July 25, page 45).

R. L. Werner
Asst. Chief Engineer
R. D. Werner Co. Inc.
Greenville, Pa.

• *The association's address is Engineers Bldg., Cleveland 14, O.*

Module Units Maker

We are interested in the article, "Module Units Speed Subassembly" (July 11, page 92). Where may prefab work stations of this type be purchased?

Don P. Henry
Sales Engineer
Subcontract Division
Weber Engineered Products Inc.
Cincinnati

• *These units are made by Bathey Mfg. Co., Plymouth, Mich.*

Nonmagnetic Metals

Would you please furnish information regarding nonmagnetic metals with magnetic shielding qualities? Because there have been so many discoveries in metals the last few years, we thought you would know some not generally known.

R. L. Perrenot
Purchasing Agent
Wilson-Mobberley Development Co.
Dallas

• *For information on magnetic properties of metals, we suggest you write: Carroll W. Lufcy, Chief of the Magnetics Division, U. S. Naval Ordnance Laboratory, White Oak, Md.*

Calumet Division, Calumet and Hecla, Inc., Calumet, Michigan

"Cities Service Heat Prover Played A Major Role In Our Expansion Program"

Miners and refiners of copper, the Calumet, Michigan Division of Calumet and Hecla, Inc., relies on two power plants to operate its many mines, reclamation plants, mills, manufacturing facilities and mine rehabilitation projects.

The two plants, located at Lake Linden and Hubbell, were recently brought up to date. The Lake Linden plant now has modern steam generating equipment fired with pulverized coal. The Ahmeek plant was equipped with new coal distributors for its underfeed stokers and new plastic monolithic furnace settings.

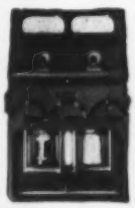
This modernization program, along with a planned preventive maintenance program which is now being put into effect, is expected to raise the KW capacity of these plants from 20 megawatts to 30 within the next few months.

The Cities Service Heat Prover has played a major role in this improvement program. It is used extensively to examine combustion conditions in the furnaces, check station instruments, and guard against air infiltration through boiler settings and duct work, thus enabling plant personnel to operate the equipment constantly at design efficiencies or better.

Says Power Superintendent, Robert Hein: "The portable Cities Service Heat Prover has proved invaluable in our operation. We are now using 150,000 tons of coal per year and operating at boiler efficiencies around 86%. By giving us a quick, accurate check on our firing conditions, the Heat Prover has been directly responsible for much of this record."

The Heat Prover is supplied and maintained free by Cities Service. For further information write Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y.

Calumet Reclamation Operation reclaims stamp sands processed years ago and dumped into lake. Further processing will extract copper. For power, dredge relies on the Calumet Division's Lake Linden Power Plant.



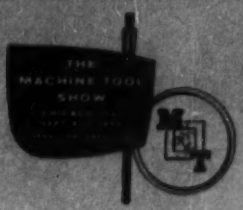
Taking Readings With Heat Prover has helped Calumet Division achieve 86% boiler efficiency. Will aid further in raising KW capacity from 20 to 30 megawatts. The unique instrument enables maximum heat benefits from coal.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

SNYDER SEGMENTED AUTOMATION in 91 station, 182 operation, in-line transfer machine features four segments which can operate independently or as a unit to assure continuous production of automotive automatic transmission cases at 100 cases an hour at 80% efficiency

BOOTH 1222



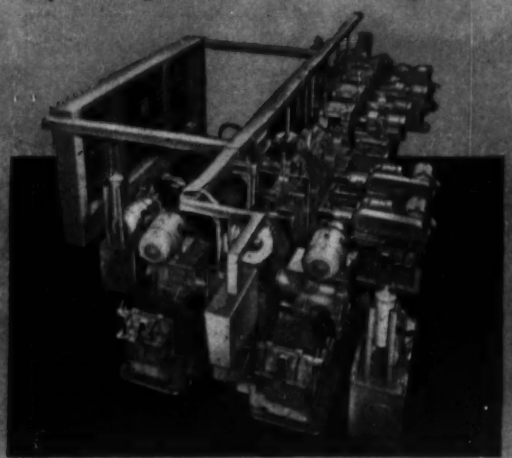
SNYDER

TOOL & ENGINEERING COMPANY

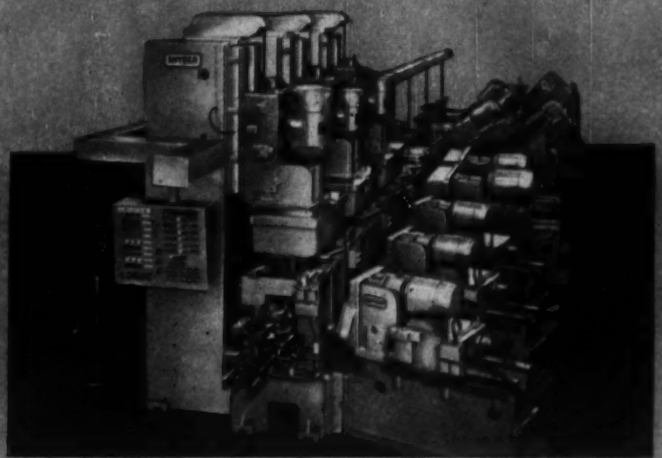
3400 E. LAFAYETTE, DETROIT 7, MICHIGAN

30 Years of Successful Cooperation with Leading American Industries

SEGMENT 1: 40 feet long, 19 stations, 10 spindles. Part manually loaded, both ends face milled, counterbored, three diameters rough and finish bored and faced, two pads side milled, pump pad face milled, clearance slot milled. Part tilted 90 degrees in processing.

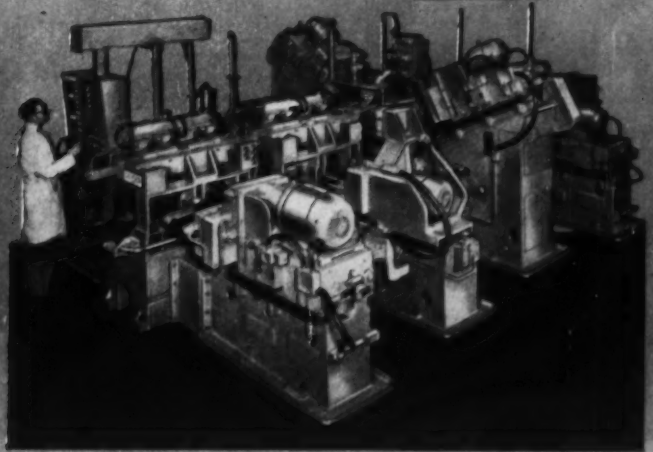


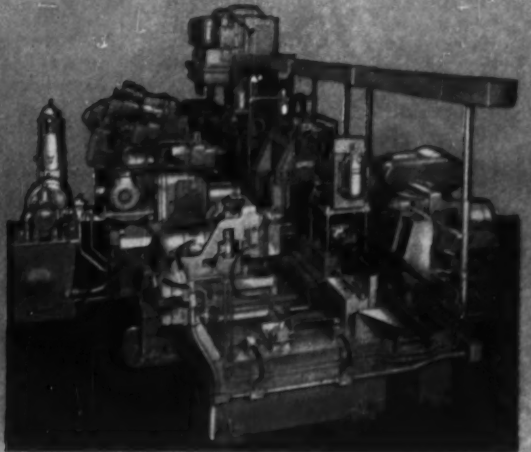
SEGMENT 2: 47 feet long, 31 stations, 91 spindles. In top face, end and at angular locations inside, 51 holes are drilled, countersunk, semi-finish and finish reamed, spotfaced, tapped. Part is tilted 90 degrees and rotated.



SEGMENT 3: 26 feet long, 17 stations, 21 spindles. Various drilling, chamfering, tapping, counterboring, reaming, spotfacing operations in both case sides. Part removed from transfer bar to special fixture and tipped 45 degrees to process angular inside hole, returned to transfer bar, turned 90 degrees, tilted 90 degrees to bring pump face up.

SEGMENT 4: 36 feet long, 24 stations, 60 spindles. Various drilling, chamfering, tapping, semi-finish boring and facing operations.

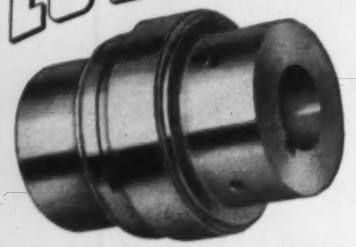




"After 15 Years the Cushions Were Worn"

... actual report on

LOVEJOY



Flexible Couplings

Up to fifteen years maintenance-free service is not unusual with Lovejoy lubrication-free flexible couplings.

Performance like this is practical proof of these soundly engineered features:

SIMPLE, RUGGED CONSTRUCTION
Fewer parts. No intricate mechanisms. Nothing to lubricate.

LOAD TRANSMITTED BY CUSHION COMPRESSION
No wear on the metal jaws.

DOUBLE-LIFE CUSHIONS
One half of the cushions act as idlers—except on reversible loads. A quick interchange provides a new set of cushions. This can be done without dismantling the coupling.

Illustration at right shows a Lovejoy Type CF flange-mounted coupling. Rated at 160 hp., 800 rpm., this space saver connects drive shaft between diesel power unit and generator.

You can get Lovejoy performance for your application.

Let us know your requirements or request complete-line catalog.

LOVEJOY FLEXIBLE COUPLING CO.

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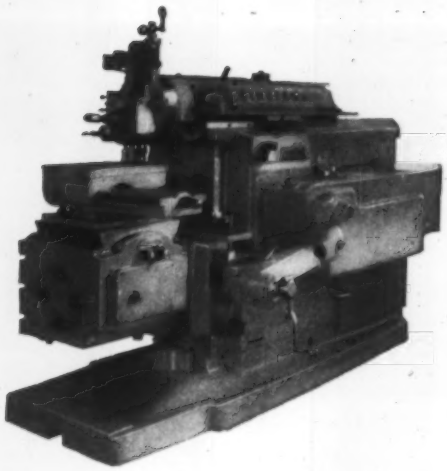

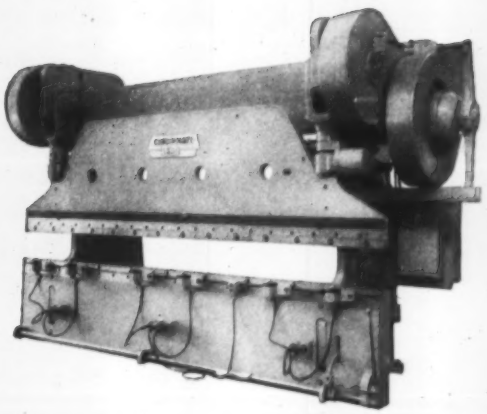

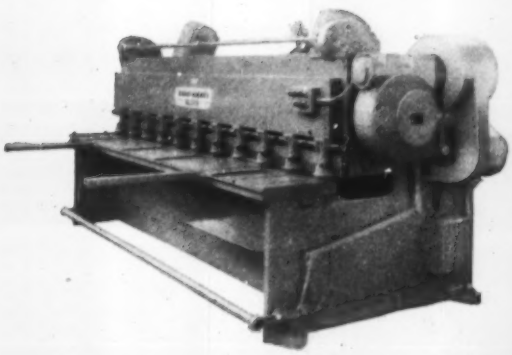

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The Cincinnati Shaper Company

announces a

5 Year Guarantee

on material and workmanship on all new machines shipped after September 1, 1955. This guarantee is evidence of the unusual dependability of our machines.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

See the Landis designs that establish

NEW Plain Grinders

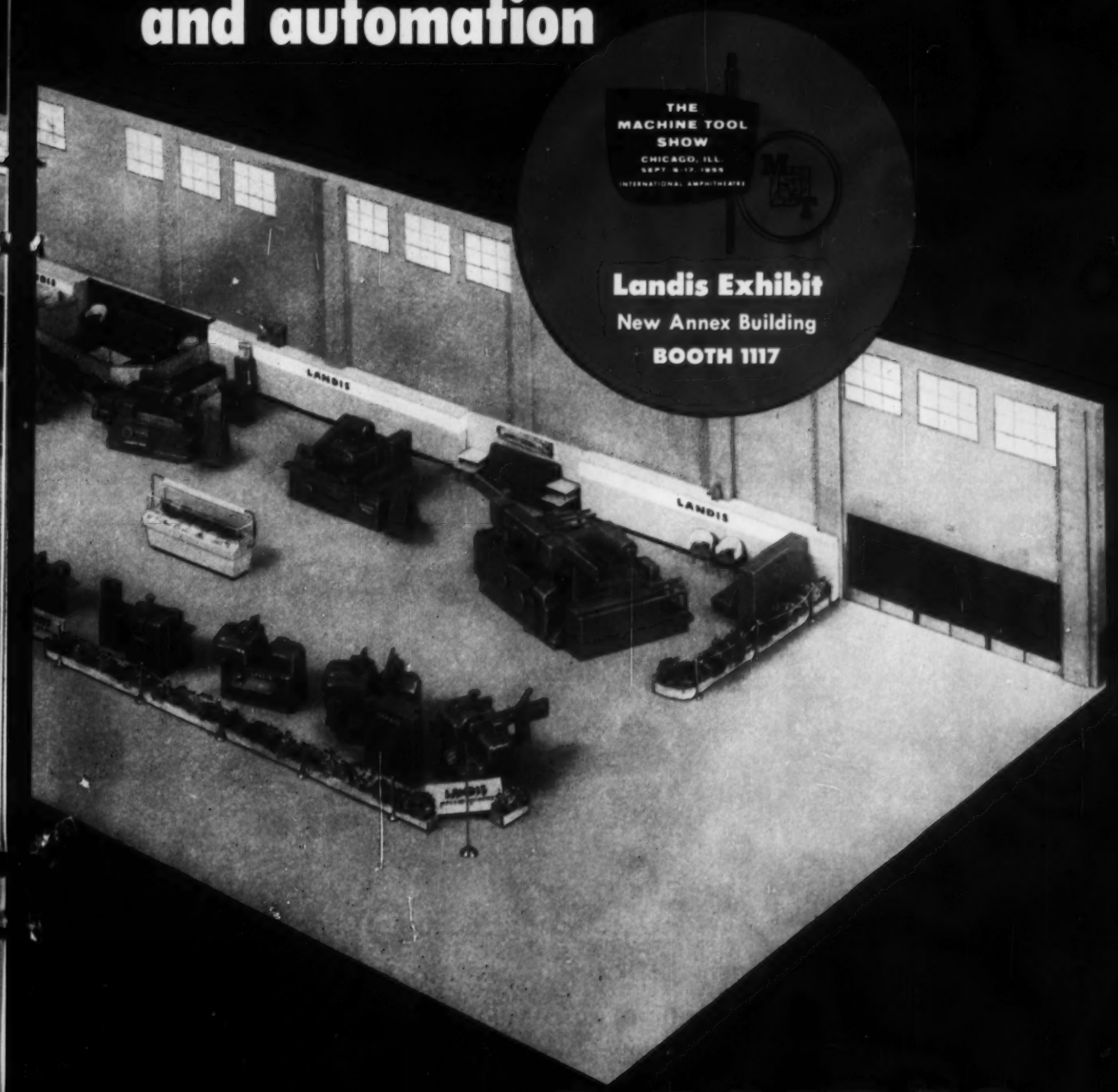
NEW Universal Grinders

NEW Centerless Grinders

NEW Automation Ideas

NEW Tooling and Gaging Methods

the trends in
new precision cylindrical grinders
and automation



LANDIS

precision grinders

NEW BRITAIN

Automatics

See the newest approaches to

Automatic Bar and Chucking Machines; Precision Boring Machines; Copying Lathes; Horizontal Boring, Drilling, and Milling Machines.

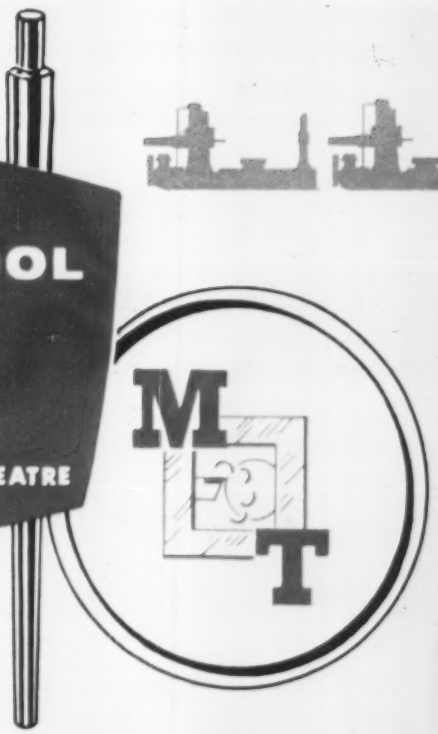
The NEW BRITAIN MACHINE COMPANY

LUCAS
of Cleveland

more profitable metalworking

BOOTH 1419

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE



New Britain-Gridley Machine Division, New Britain, Connecticut
Lucas Machine Division, Cleveland 8, Ohio

Steel edges...so smooth even germs find no hiding place

● A surgeon's scalpel blade is difficult to produce and the big problem is where you'd least expect—forming the back of the blade. Unless the edge of the strip steel is perfectly round and smooth the backing will not form properly, causing the scalpel to cut the surgeon's gloves, providing hiding places for bacteria and making sterilization most difficult.

Recognizing this problem, the Athenia Steel Division of National-Standard Company developed a special process to provide the special edge needed so a customer could successfully produce the proper shape. A small detail perhaps but it contributes to surgical success and has given this customer a competitive advantage on surgical blades.

Athenia's production men specialize in development service such as this and in addition they produce standard spring steels and specialty items to the highest known standards of quality and uniformity.

Why not try Athenia and see what can be done for you.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape
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Special Machinery for Metal Decorating
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

CALENDAR
OF MEETINGS

Aug. 31-Sept. 26, World's Fair of Power: S. Lake Shore Dr. adjacent to Soldiers Field, Chicago. Sponsor: General Motors Corp., General Motors Bldg., Detroit 2, Mich.

Sept. 5-6, American Machine Tool Distributors Association: Annual meeting and show, Blackstone hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 6, Pa. Secretary: Thomas A. Fernley Jr.

Sept. 6-8, Industrial Truck Association: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Association's address: 526 Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Sept. 6-8, Material Handling Institute Inc.: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Sept. 6-17, Metalworking Machinery & Equipment Exposition: Coliseum, Chicago. Information: Exhibition & Convention Management Inc., 2689 E. Overlook Rd., Cleveland 6, O. General Manager: C. L. Wells.

Sept. 6-17, National Machine Tool Show: International Amphitheatre, Chicago. Sponsor: National Machine Tool Builders Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 6-17, Production Engineering Show: Navy Pier, Chicago. Sponsor: National Machine Tool Builders' Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 9-11, Metal Powder Association: Fall closed meeting, the Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 11-14, National Metal Trades Association: Eastern plant management conference, Essex and Sussex hotels, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: C. L. Blatchford.

Sept. 11-16, American Chemical Society: Fall meeting, University of Minnesota, Minneapolis. Society's address: 1155 16th St., N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 12-14, American Road Builders Association: Annual conference of county engineers and officials, New Riverside hotel, Gatlinburg, Tenn. Association's address: World Center Bldg., Washington 6, D. C. Secretary: Eugene Reybold.

Sept. 12-14, Allied Railway Supply Association: Annual meeting and exhibit, Sherman hotel, Chicago. Association's address: P.O. Box 5522, Chicago, Ill. Secretary: Charles P. Weil.

Sept. 12-15, Automotive Electric Association: Fall meeting, the Homestead, Hot Springs, Va. Association's address: 16223 Meyers Ave., Detroit 35, Mich. Secretary: S. W. Potter.

Sept. 12-15, Society of Automotive Engineers Inc.: Tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 12-16, Instrument Society of America: Annual conference and exhibit, Shrine Auditorium and Exposition Hall, Los Angeles. Society's address: 1319 Allegheny Ave., Pittsburgh 33, Pa. Executive director: William H. Kushnick.

Sept. 14, Steel Kitchen Cabinet Manufacturers Association: Fall meeting, Hotel Cleveland, Cleveland. Association's address: 1008 Engineers Bldg., Cleveland, O. Secretary: Arthur J. Tuscany Jr.

Sept. 14-15, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 14-16, Porcelain Enamel Institute: Shop practice forum, Deshler-Hilton hotel and Ohio State University, Columbus, O. Institute's address: 1145 19th St. N.W., Washington 6, D. C. Secretary: John C. Oliver.

expand metal

shrink metal

roll metal

Grotnes

THE TREND TO

JAMESTOWN, N. Y.

SITUATION: Growing sales were taxing production capacity of tool mfr's. forge shop. Had four belt-driven board drop hammers.

SOLUTION: Four Ceco-Drops now in operation —have been giving excellent service. Production is up—maintenance is down. "3 hours charged against Ceco-Drops in 42 days".—"One Ceco-Drop ran 108 hrs. (21 days) without maintenance or die work."

COLUMBUS, O.

SITUATION: Job shop with 5 Board Drop Hammers finds equipment obsolete—cannot compete with lower prices and higher production of other more modern shops.

SOLUTION: Initiated 10 year program of modernization to include 15 Ceco-Drops. Three Ceco-Drops already installed to replace board drop hammers.

FLINT, MICH.

SITUATION: Large Auto Co. with 16 Board Drop Hammers—(7 of them Chambersburg "J's")—ranging in age from 7 to 30 years. Lowered production rates and mounting maintenance costs.

SOLUTION: Started modernization in 1953. Converted* four "J's" with Ceco-Drop upper works. Cost and down time reduced —production up—operators like them. Other "J's" to be converted*. Ceco-Drops will replace older board hammers.

*Saves cost of anvil and foundation!

CHICOPEE, MASS.

SITUATION: The managers of one of the East's largest forge shops saw Ceco-Drops in operation in another plant. Decided on this type of hammer for their shop.

SOLUTION: Promptly ordered a 2,000 lb. Ceco-Drop and a 2,500 lb. Ceco-Drop. After a year's service their record was so good that two more 2,000 lb. Ceco-Drops were ordered. These latter are now in operation.

ALLENTOWN, PA.

SITUATION: Tool works had the problem of keeping 23 "old dog" board drop hammers operating profitably. Had but one recent model "J" Chambersburg Board Drop.

SOLUTION: Management launched a modernization program calling for nine Ceco-Drops capable of producing a yearly tonnage in excess of the 23 old board drop hammers. Four of the Ceco-Drops are now in operation, shop layout has been revised. Efficiency and production methods have been improved.

CHAMBERSBURG

CHAMBERSBURG

CECO-DROPS . . .

SKOKIE, ILL.

SITUATION: One of largest manufacturers of hand tools is planning a new shop. Decided to have modern Gravity Drop Hammers.

SOLUTION: Selected Ceco-Drops, and on a programmed basis is replacing board drop hammers with Ceco-Drops. To date, two 2,000 lb. Ceco-Drops and one 2,500 lb. Ceco-Drop are in operation—"Doing fine".

. . . and remember the Lansing Story?

LANSING, MICH.

Lansing, Mich. is unique among industrial cities in the concentration of drop forging activity in its many factories. It may well claim the title of "Drop Forging Capital of the World". In Lansing are six great forging shops covering 14 acres of land, with a working area of 985,579 sq. ft. All these great forging shops are using Chambersburg Ceco-Drops.

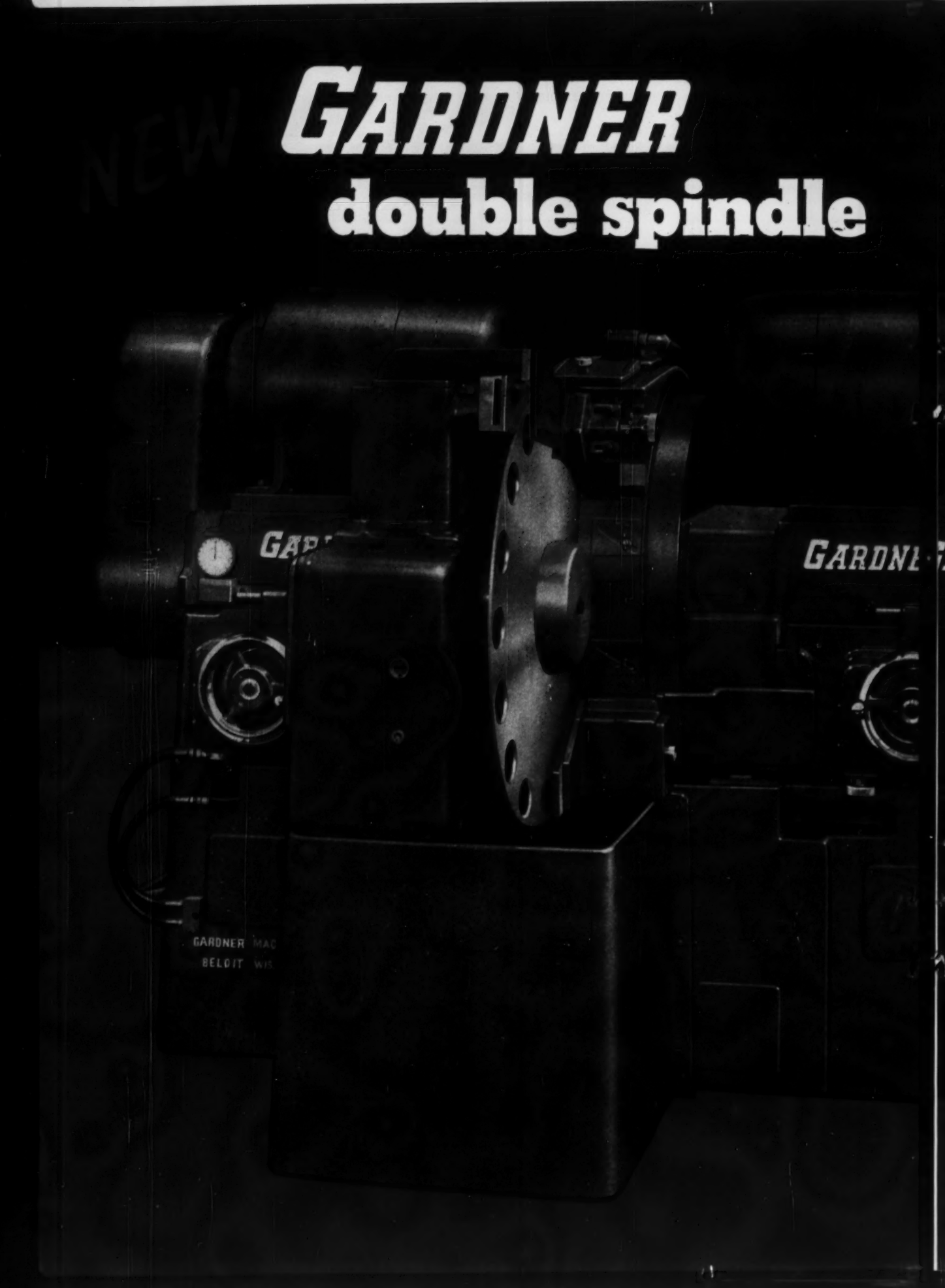
Forge Shop No. 1—installed the first Ceco-Drop in 1947—now forging connecting rods.
Forge Shop No. 2—has installed 5 Ceco-Drops since 1950—making automotive forgings.
Forge Shop No. 3—bought 4 Ceco-Drops since 1948—Commercial and automotive forgings.
Forge Shop No. 4—bought seven Ceco-Drops in the last six years.
Forge Shop No. 5—Purchased 3 Ceco-Drops in 2 years.
Forge Shop No. 6—One of largest in world. Installed 11 Ceco-Drops since 1951.

The gravity drop hammer with short stroke control

ENGINEERING CO.

PENNSYLVANIA

GARDNER
double spindle

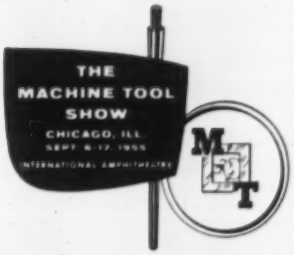


grinder

New 2H30 engineered for higher production— greater precision

- ***NEW*** Rigid Spindle Design
- ***NEW*** Massive Bed Construction
- ***NEW*** Precision Feed of Discs
- ***NEW*** Accurate Dressing Mechanism
- ***NEW*** Convenience of Setup and Operation

grinds **TWO** parallel surfaces in **ONE** operation



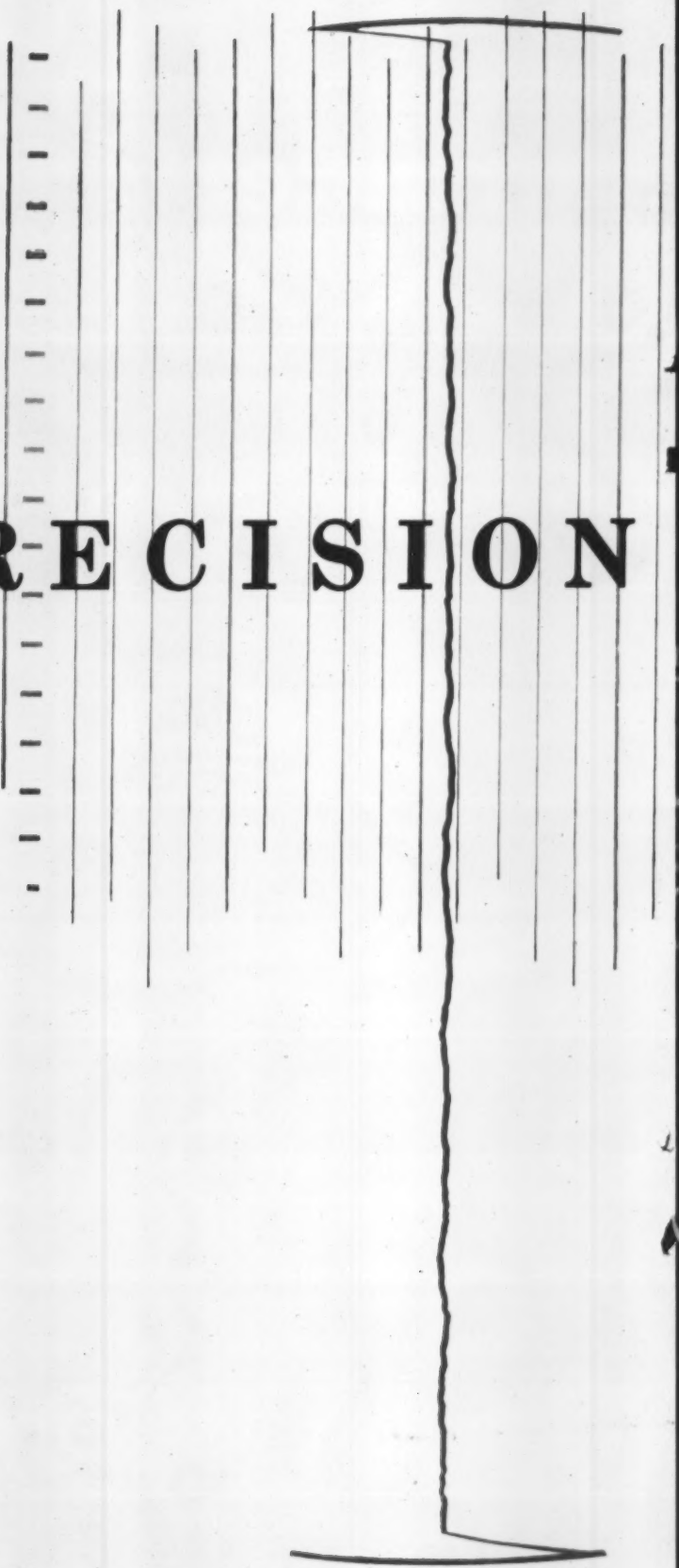
In operation at Booth 1115

GARDNER

precision disc grinders

BELOIT, WISCONSIN

THE PRECISION



LINE

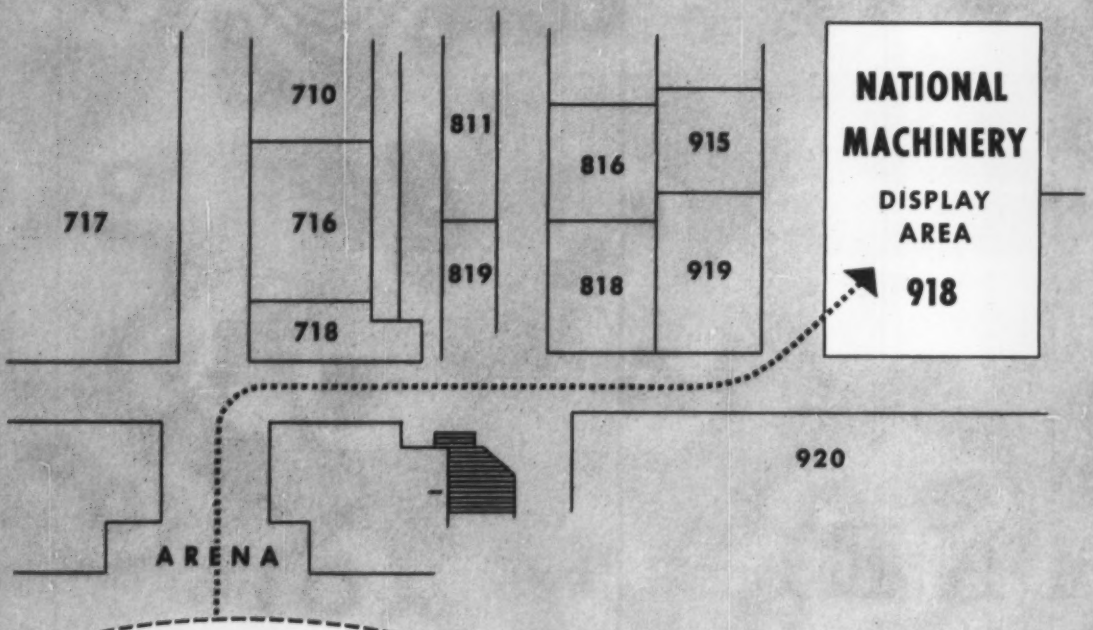
THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-12, 1955
INTERNATIONAL AMPHITHEATRE

AT THE SHOW . . .
BOOTH 1416

Don't miss seeing the latest developments in The Precision Line of Fellows Gear Production Equipment. If you don't make it to the Show . . . then it will pay you to contact your nearby Fellows Office for the latest facts.

- THE FELLOWS GEAR SHAPER COMPANY,
  Head Office and Export Department:
  78 River Street, Springfield, Vermont.
  Branch Offices: 319 Fisher Building, Detroit 2;
  5835 West North Avenue, Chicago 39;
  2206 Empire State Building, New York 1;
  6214 West Manchester Avenue, Los Angeles 45.

Fellows *Gear Production Equipment*



DISPLAY AREA 918 . . . PROGRESS IN FORGING

AT THE MACHINE TOOL SHOW,

CHICAGO, SEPTEMBER 6 TO 17!

We at National Machinery, WHQ*
for the development of advanced methods
and machinery for the forging industry,
for more economically producing
a wide variety of parts—
routine or unusual, ferrous or non-ferrous,
automatic or semi-automatic,
by cold forging or hot forging—
invite you to visit our working exhibit
at the coming machine tool show,
the first in seven years!

*WORLD HEADQUARTERS

NATIONAL
MACHINERY COMPANY

TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • HOT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

Mr. DISTRIBUTOR

Industry is Demanding

LUSTERIZED*

TRADE-MARK

FINISH

THE FINEST COLD DRAWN FINISH NOW AVAILABLE

BRIGHTER CLEANER SMOOTHER

***No Distributor can afford to be without this* FAST SELLING STEEL**

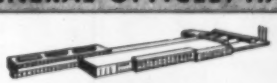
* Trade-Mark Pat. Pend.

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—



HARVEY, ILL.

DETROIT, MICH.

BUFFALO, N. Y.

MANSFIELD, MASS.

DO YOU NEED ADDED MANUFACTURING FACILITIES or ENGINEERING ASSISTANCE?

For Instance:

- New Product design or research
- Help in developing your processing
- Design and fabrication of your tooling and gaging
- A source for components you would rather not make
- An organization to assume full manufacturing responsibility

For many years the Sheffield Corporation in rendering these services to manufacturers, has been able to save them thousands of dollars. Why? Because these services require specialists and specialized equipment which many manufacturers would not be economically justified in adding to their own organizations.

When you turn such a problem over to Sheffield you concentrate all the responsibility under one contract. There is no opportunity for buck passing. You get a specified result at a specified delivery date.

Sheffield has engineering offices in Dayton and many other cities. The main plant in Dayton is fully equipped for manufacturing and especially organized for the fabrication and tryout of dies of all sizes.

As a leader in the field of Precision Measurement, Sheffield offers the maximum in Quality Control.

Before you need services such as these, have a Sheffield engineer show you in your office, the recent sound slide film which illustrates the operation of Sheffield's Contract Service Division.

Write to Contract Service Division—***Sheffield Corporation, Dayton 1, Ohio, U. S. A.***

7154

See us at the Machine Tool Show—Booth 1305

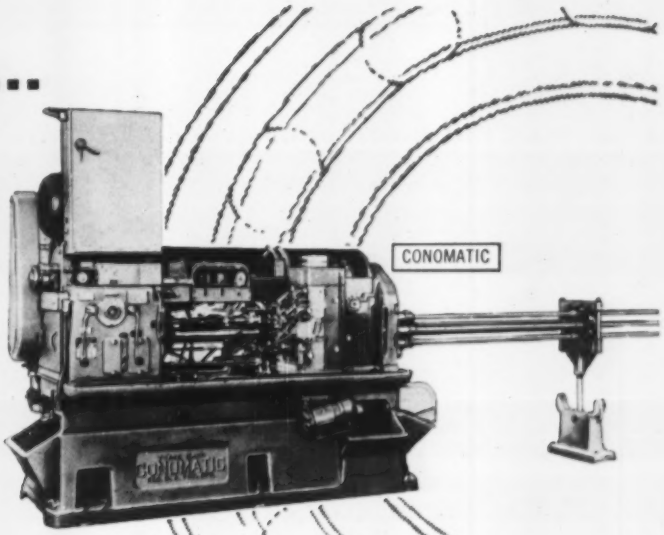
MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

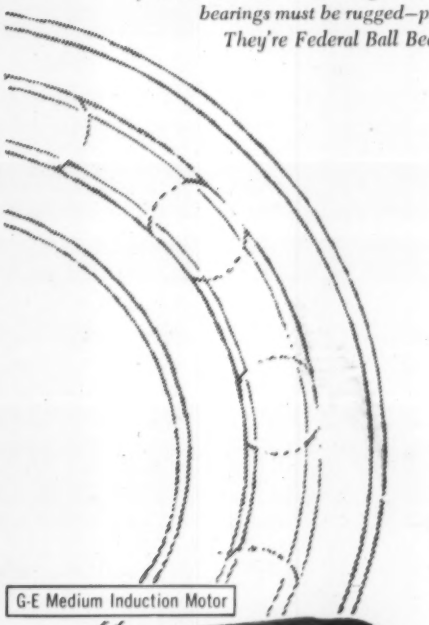
SHEFFIELD

MANUFACTURE AND MEASUREMENT FOR MANKIND

to feed a tool...

Automatic feed transmissions on newest type Conomatic Six Spindle Bar Machines have to deliver a powerful, steady tool drive under heavy loads for precision carbide machining. Feed shaft bearings must be rugged—precise. They're Federal Ball Bearings.





or quiet a motor...

The smooth hum of today's precision-built motors whispers the efficiency of every part. Here, too, Federal Ball Bearings quietly perform their continuous, anti-friction assignment—whatever the size—whatever the type.

so much of industry *turns* on FEDERAL ball bearings

Machine tools—motors—or moving vans! At plant, home, machine shop! On the highway, on the farm—where there's anti-friction work to be done, you'll find Federal Ball Bearings quietly and efficiently on the job. Hundreds of types—12,000 sizes—produced by this 50-year-old manufacturer of ball bearings...exclusively.

When Federal Ball Bearings are a part of so many things you *use*, shouldn't they be a part of the things you *make*?

Just off the presses! *175 pages of ball bearing and engineering data*—FEDERAL'S NEW CATALOG! *Just drop us a line and we'll speed you your copy.*

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

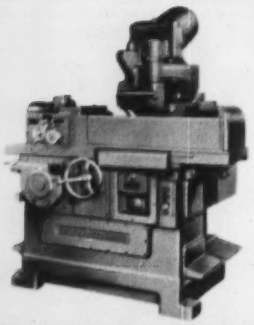
Federal BALL BEARINGS

One of America's Largest Ball Bearing Manufacturers

Look for **CARBORUNDUM®** *at the Machine Tool Show*

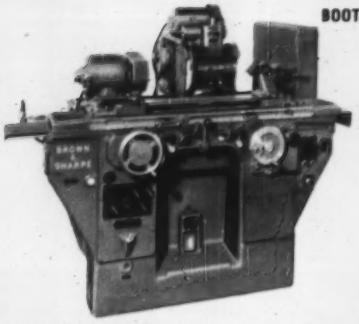
...ON THE LEADING

BOOTH NO. 1322



BARBER-COLMAN MODEL 8-5 HOB SHARPENER

BOOTH NO. 520



BROWN & SHARPE NO. 1 UNIVERSAL GRINDING MACHINE

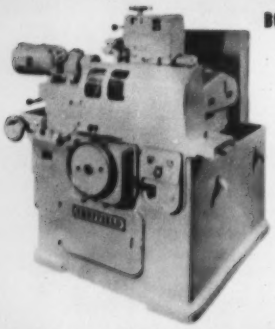
BOOTH NO. 1319

EX-CELL-O STYLE 44-A PRECISION GRINDER

BOOTH NO. 1117

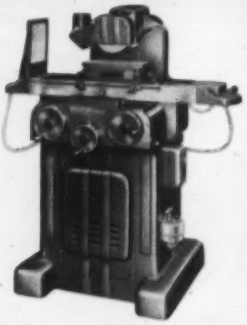
LANDIS NO. 12 CENTERLESS GRINDER

BOOTH NO. 1305



SHEFFIELD MODEL 100 PRECISION ANNULAR FORM GRINDER

BOOTH NO. 811



TAFT-PEIRCE NO. 1 PRECISION SURFACE GRINDER

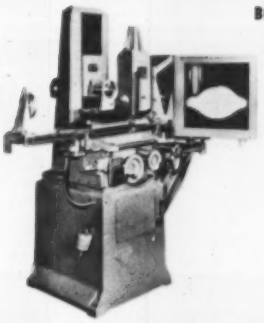
THE NEWEST DEVELOPMENTS in grinding machines will be on display at the Machine Tool Builders Show in Chicago. See them all—and notice how many models of these modern machines are equipped with CARBORUNDUM Brand Grinding Wheels.

THE MACHINE BUILDERS' DECISION to use Wheels by CARBORUNDUM on their show machines is your most positive assurance that the brand name CARBORUNDUM means precision ... higher production ... lower cost per unit machined. For engineering helps on *your* specific grinding problems, ask your CARBORUNDUM Distributor or salesman.

➡ Look for other **LEADING GRINDING MACHINES** featured in **CARBORUNDUM'S** advertising in

GRINDING MACHINES

BOOTH NO. 818

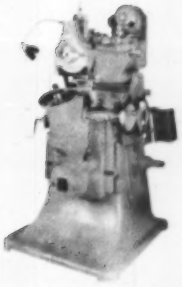


CLEVELAND GRINDING MACHINE COMPANY "VISUAL GRIND"

BOOTH NO. 1112

COLONIAL NO. CS-5-36 UNIVERSAL BROACH SHARPENER

BOOTH NO. 804

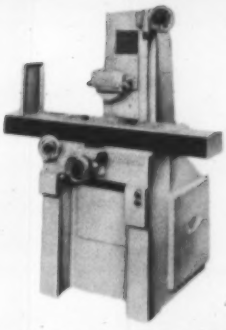


OLIVER 20" TEMPLATE TOOL BIT GRINDER

BOOTH NO. 415

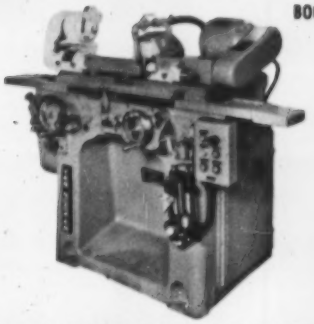
PARKER-MAJESTIC MODEL 2-Z SURFACE GRINDER

BOOTH NO. 1407



THOMPSON TYPE "D" 6 X 18 X 18" SURFACE GRINDING MACHINE

BOOTH NO. 905



VAN NORMAN MODEL 418 PLAIN CYLINDRICAL GRINDER

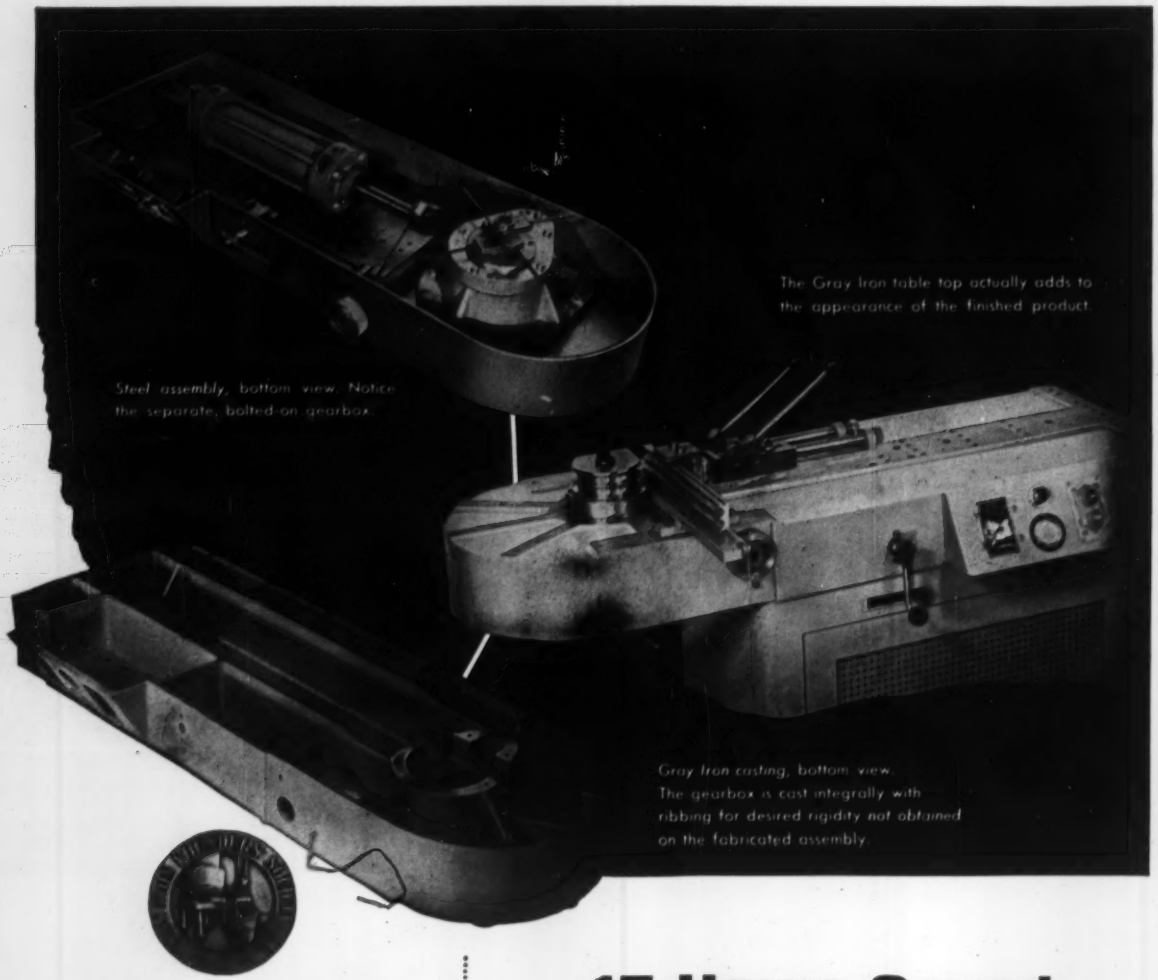
CARBORUNDUM

REGISTERED TRADE MARK

...continually putting more **SENSE** *in your abrasive* **DOLLAR**

MACHINERY and **PRODUCTION**, Sept.; **AMERICAN MACHINIST**, Aug. 29;

GRINDING & FINISHING, Aug.; **IRON AGE**, Aug. 25


The Gray Iron table top actually adds to the appearance of the finished product.
Steel assembly, bottom view. Notice the separate, bolted-on gearbox.
Gray Iron casting, bottom view. The gearbox is cast integrally with ribbing for desired rigidity not obtained on the fabricated assembly.

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

15 Hours Saved ...by Casting in Gray Iron

Producing these machine table tops in Gray Iron takes 7½ hours. Previously, the tops were fabricated of torch-cut steel segments, requiring 22¾ hours.

Redesigning in Gray Iron has increased the rigidity of the table tops, improved their appearance and simplified production operations.

There are many valuable advantages which Gray Iron castings can offer *you*. Call your nearest Society member foundry and through him the full facilities of this association are available to help you.

Or, write direct to Gray Iron Founders' Society, Inc., National City-E. 6th Bldg., Cleveland 14, Ohio, for helpful technical and business information.

GRAY IRON FOUNDERS' SOCIETY

In Chicago...
you'll see for the first time

A NEW LINE OF GISHOLT MACHINES

identified by this medallion:

The new Gisholt MASTERLINE medallion identifies this new and improved series of machines—and re-emphasizes Gisholt achievements in building the master tools of industry since 1887.

Based upon nearly 70 years of specialized experience, the new Gisholt MASTERLINE machines are ready to give you production far in advance of their time.

Come in and inspect them at close range. Watch them operate. Learn what these new Gisholts can do to cut costs on your work.

Be sure to visit the Gisholt exhibit—Booth 1413, Exhibition Hall.

GISHOLT
MACHINE COMPANY

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Setting speeds and feeds made as easy as tuning a radio . . . so simple any one can pre-set it.

now you can plan and

. . . with the new

Carlton

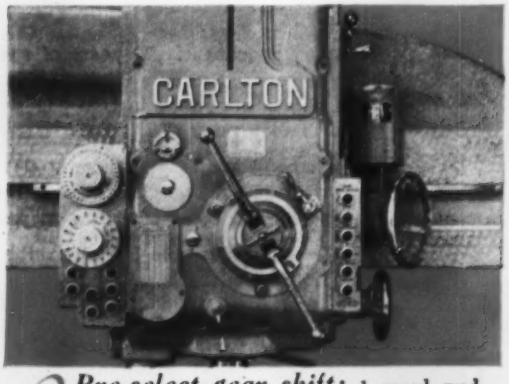
The Carlton Machine Tool Co. announces the introduction of the new Carlton-Leber speed-feed pre-selector and program systems. The two new devices offer faster, and therefore more economical hole drilling production.

Programming Here's how the Carlton-Leber programming works: your production engineering department studies the workpiece drawing and determines the sequence of drilling operations and the correct speed and feed for each. This data is recorded on a routing sheet or blueprint

Operator is free to concentrate on starting and stopping spindle, changing cutting tools . . . speeds and feeds have all been pre-set.

Carlton Radial Drills now come with your choice of 3 different

1 ***Manual gear shift:*** 2 shifter levers for controlling speeds, 2 shifter levers for controlling feeds.



2 ***Pre-select gear shift:*** 1 speed graduated dial and 1 feed graduated dial pre-set speeds and feeds.

pre-set speeds and feeds for an entire drilling program

programming

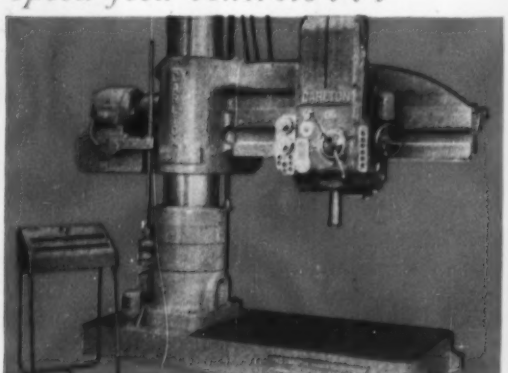
and is transferred to the programming console.

The programming console contains an indexing dial which shows the operation sequence number being performed. Operator has local control and can perform operations out of sequence by manually advancing or reversing the indexing dial.

Pre-selector For less lengthy or complicated drilling jobs, the programming unit can be disconnected through a selector switch and the pre-selector then becomes operative. The pre-selector saves time by allowing operator to select the speed and feed for the next operation while the machine is under cut. Pre-selector may be furnished with or without the programming unit. In fact, you can now buy your Carlton radial drill with your choice of one of three different types of speed-feed control as illustrated below.

Be sure to see the new Carlton-Leber pre-selector and programming devices in action at the Machine Tool Show in Carlton booth 919. In the meantime, write for your descriptive bulletin. The Carlton Machine Tool Co., Cincinnati 25, Ohio, U.S.A.

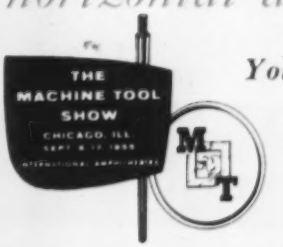
speed-feed controls . . .



3 ***Pre-selector and programming gear shift*** sets up correct speeds and feeds for a complete sequence of operations.

Carlton

horizontal and radial drills



You're invited . . . to see the new Carlton-Leber pre-selector and programming devices. Visit us in booth 919 at the Show.

metalworking history will be made by

NIAGARA PRESSES, PRESS BRAKES

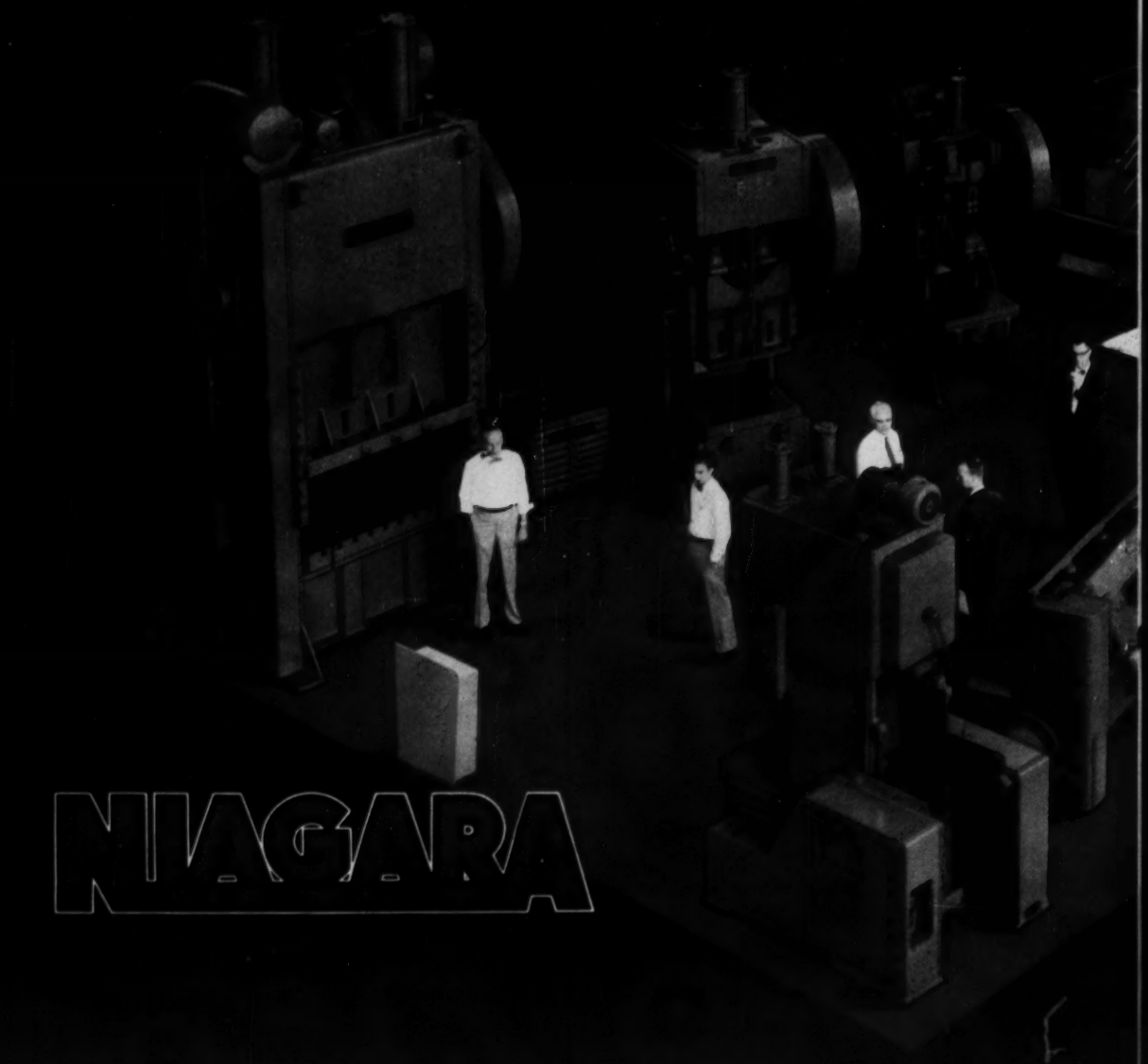
in action!

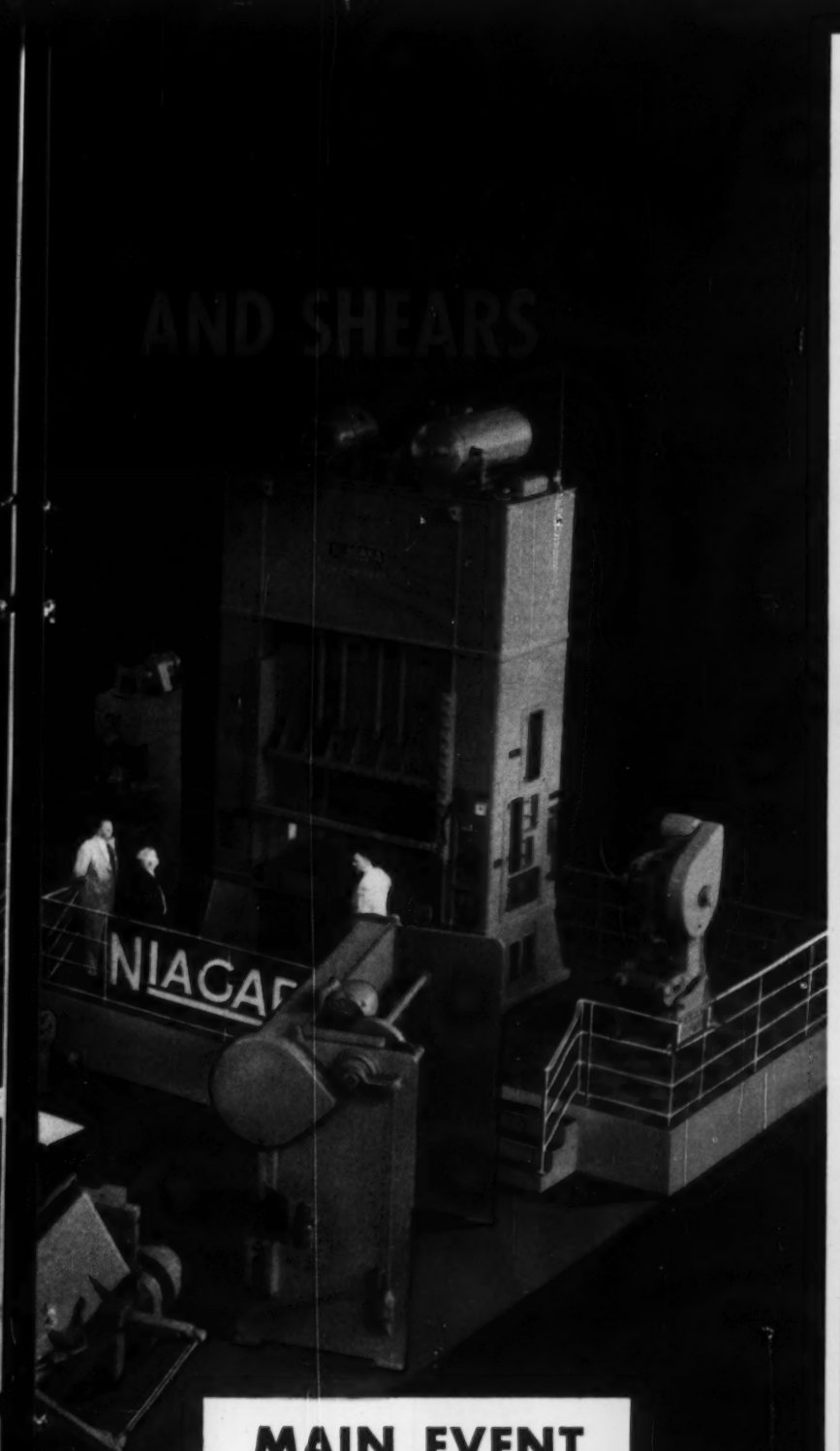
Watch them operate. Examine them. See a revolution in metalworking with these modern wonders in action. You'll be electrified by brand new machines never before exhibited, stirring new developments on conventional machines and engineering marvels in press automation.

Truly, Niagara promises you the greatest demonstration of the word "New" in the whole Machine Tool Show.

And everybody — yes, everybody — top management and all — will be on hand to give you a warm greeting and a full explanation of anything you wish to know about history-making Niagara machines. Come early, while you're fresh. There's so much to see!

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.





NEW DESIGNS

NEW LINES

NEW COMPACTNESS

NEW STAMINA

NEW ECONOMIES

NEW ACCURACY

NEW OPERATING EASE

NEW SAFETY

NEW CAPACITIES

NEW PRODUCTIVITY

MAIN EVENT
Booth No. 715

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

VISIT BOOTH 110
AT THE NAVY PIER
Production Engineering Show

New
REDUCTORS

See the **NEW**
BOSTON GEAR
Speed Reducers

100 SERIES

Designed by Boston Gear specialists to deliver

Certified
MAXIMUM HORSEPOWER PER DOLLAR
by Independent Laboratory tests

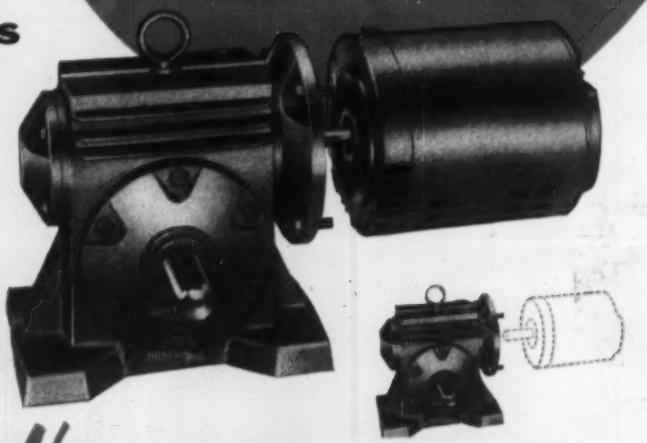
Every feature you want – any model you need
FROM STOCK

NEW space saving design
NEW clean contours
NEW gearing efficiency
NEW cooling fins
FAN COOLING optional on larger sizes

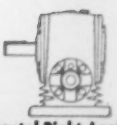
New
RATIOMOTORS

New COMBINATION Construction

Gear reduction unit and easily detachable standard end-mounted motor — combined for big maintenance savings. Permits (1) replacement of motor without disturbing gear unit, (2) replacement of original motor at any time with motor of special characteristics (totally-enclosed, etc.)



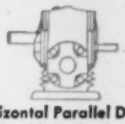
New **FLANGED REDUCTORS**
The Ratio motor gear reduction unit, supplied *without* motor. You buy and attach the motor of your own choice.



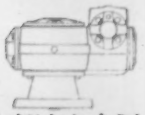
Horizontal Right Angle Drive
Worm gear on top

Horizontal Right Angle Drive
Worm gear under

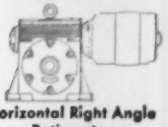
Vertical Right Angle Drive



Horizontal Parallel Drive
Double Reduction

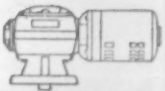


Vertical Right Angle Drive
Double Reduction

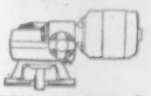


Horizontal Right Angle
Ratiomotor

Horizontal Parallel
Ratiomotor
Double Reduction



Vertical Right Angle
Ratiomotor



Vertical Right Angle
Ratiomotor
Double Reduction

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108 MODELS
1064 STANDARD STOCK UNITS

CALL YOUR **BOSTON** *Gear*
DISTRIBUTOR
for complete information — or write Boston Gear Works, 73 Hayward St., Quincy 71, Mass.

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Out-of-this-world thinking has produced down-to-earth features that speed handling, loading, maintenance and, of course, machining. Booth 1120 at the Machine Tool Show will show you why . . .

a Gray will pay.

The G. A. GRAY CO.
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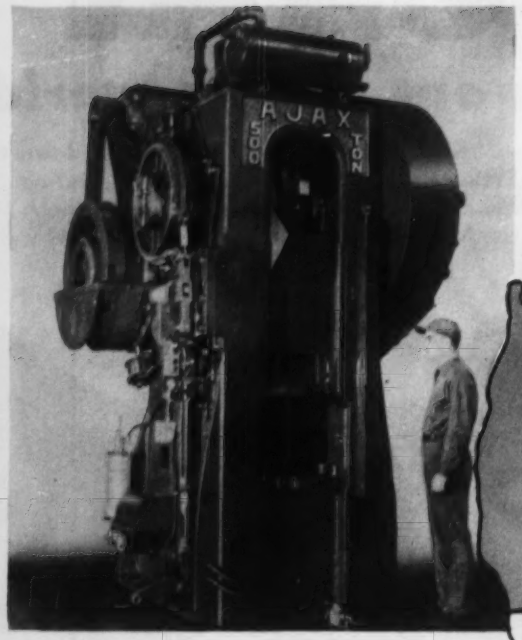
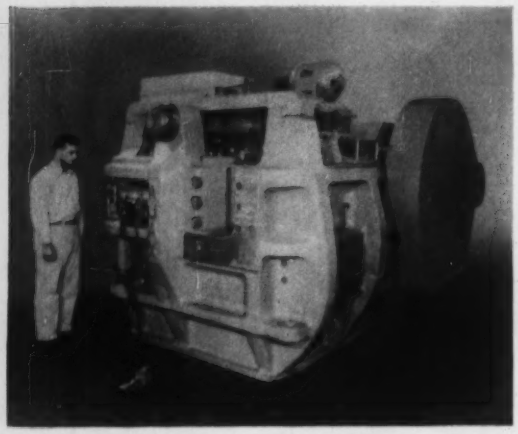
The new GRAY Universal Planer—single cuts, double cuts, triple cuts, and cross cuts —a revolutionary concept in high-speed machining.

The new GRAY Horizontal Boring, Drilling and Milling Machine—brute power and great precision with versatility unlimited.

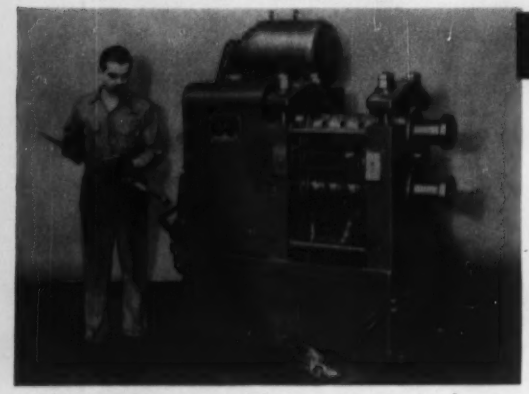
The new GRAY Handymill—at long last a powerful, rigid milling machine for the medium size job.



AJAX 500 TON FORGING PRESS



AJAX 3" FORGING MACHINE—
with automatic transfer mechanism



AJAX NO. O FORGING ROLL

see these

AJAX MACHINES

in operation at the

MACHINE TOOL SHOW

CHICAGO, ILL.

SEPT. 6-17, 1955

INTERNATIONAL AMPHITHEATRE

BOOTH NO. 1309

THE **Ajax** MANUFACTURING COMPANY

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BURLINGAME, CALIF.

6440 Fleet St.
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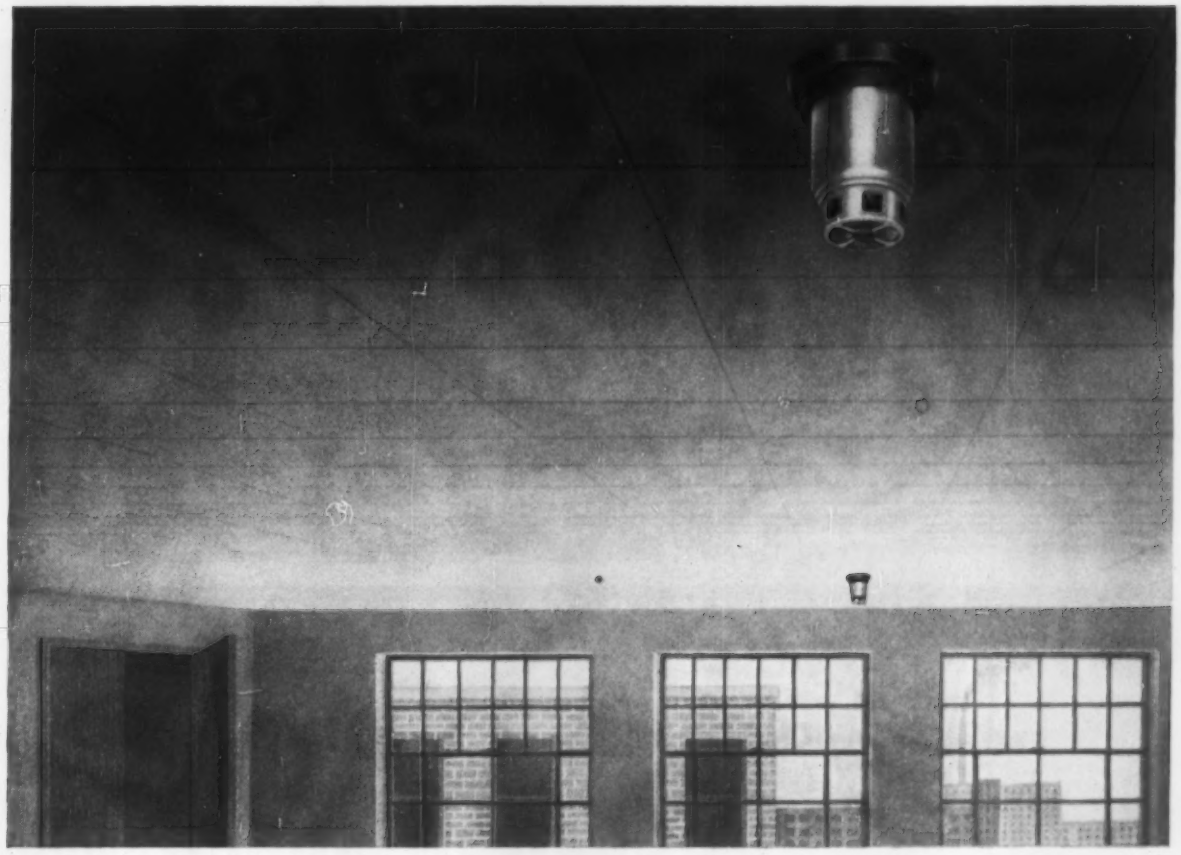
New, radio-active, automatic fire guard!

C-O-TWO PRE-DETECTOR SYSTEM



Each pre-detector head protects up to 3,600 square feet of area . . . harmless radio-active element utilizing ionization chamber principle quickly detects all forms of fire . . . requires only simple two-wire circuit and insignificant wall space for controls.

This completely new and positive means of spotting fire is just what you've always needed and wanted . . . detects in the earliest stage, invisible combustion gases, visible smoke, slow smoldering, as well as open flame. The C-O-TWO Pre-Detector System is simple to install, extremely economical to maintain and doesn't depend on thick smoke or heat for actuation.

As many pre-detector heads as necessary can be connected together in a single circuit and up to 16 separate circuits or spaces handled by one system. With a single circuit the pre-detector heads are connected directly to the fire indicating cabinet, while with multiple circuits the pre-detector heads are first connected to one or more space indicating cabinets capable of visually showing by number the exact location of the fire. Relays perform such functions as sounding alarms, closing fire doors, shutting down ventilation and releasing fire extinguishing systems.

The C-O-TWO Pre-Detector System has been subjected to extensive testing and carries Underwriters' Laboratories, Inc. listing, as well as Factory Mutual Laboratories approval. Proven pilot installations have been made in such diversified properties as a television station, an electric power company network analyzer room, a railroad signal tower, an airline flight training equipment room and the offices of an insurance company.

Don't take unnecessary chances any longer . . . the extensive fire protection experience of PYRENE—C-O-TWO over the years is at your disposal without obligation. Get complete facts about this new C-O-TWO Pre-Detector System today!

Pyrene

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C-O-TWO

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portable fire extinguishers . . . built-in fire detecting and fire extinguishing systems

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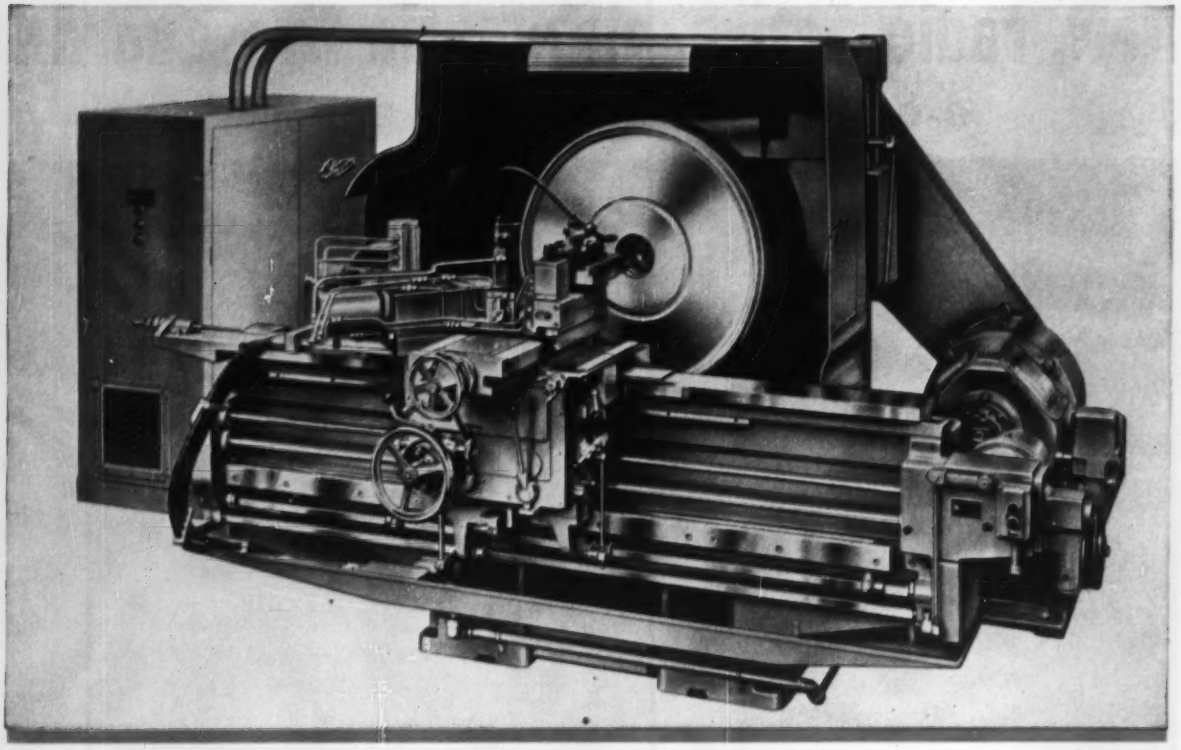


"Built-in Memory"

selects its own production speed WITH

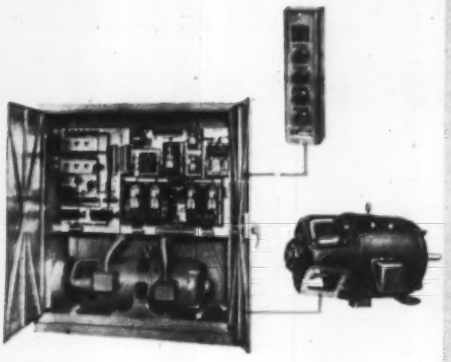
Century Performance-Rated° SELECTIVE

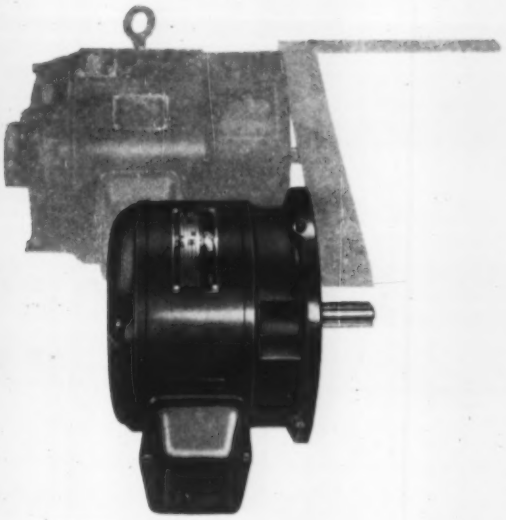
For today's "machines of the future," you can have extremely close-tolerance control over a wide range of process speeds . . . *automatically!* Century Selective Speed Drives can be equipped with "built-in memory" . . . actuated by sensitive "eye" or "feeler" controls.

These "almost-human" drives can regulate precision interlocked multi-motor drives, with speed control both by individual drive or as a group drive. Century Selective Speed Drives offer a wide range of possibilities for integration into automated production or processing sequence operations.

Our engineers will be glad to discuss the opportunities for Century Performance-Rated Selective Speed Drives in your new production planning. See us at the Production Engineering Show in Chicago, September 6-16.

Century Selective Speed drive unit maintains constant cutting speed for a contour facing operation on this "T-Lathe". From an infinite number of speeds, the drive automatically selects the optimum speed for varying kinds of work.





FIRST SHOWING!

CENTURY'S NEW SHORTER MOTORS with STANDARD NEMA "D" FLANGE MOUNTINGS For INTERCHANGEABILITY

See Century's new line of shorter, round frame, end-mounted motors in the 1-15 H.P. range . . . shown for the first time publicly at the Production Engineering Show, September 6-16.

These new motors give you new space-savings, lighter weight . . . and even better performance. The standard line has NEMA flange dimensions for easy interchange with all popular types of standard end-mounted motors. They can be furnished in open or totally enclosed fan cooled frames.

SPEED DRIVES

Performance-Rated©
MOTORS
⅛ to 400 H. P.

CENTURY ELECTRIC COMPANY

1806 PINE ST., ST. LOUIS 3, MO. • *Offices and Stock Points in Principal Cities*

See Cincinnati

SHAPERS . . . SHEARS
. . . PRESS BRAKES

—in ACTION

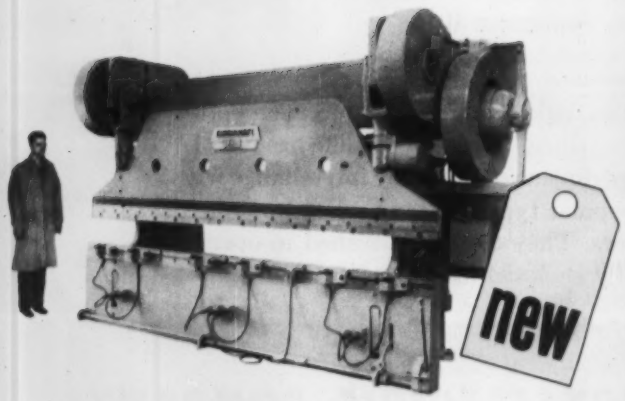
at THE MACHINE TOOL SHOW

INTERNATIONAL AMPHITHEATRE–CHICAGO, ILL.
SEPTEMBER 6–17

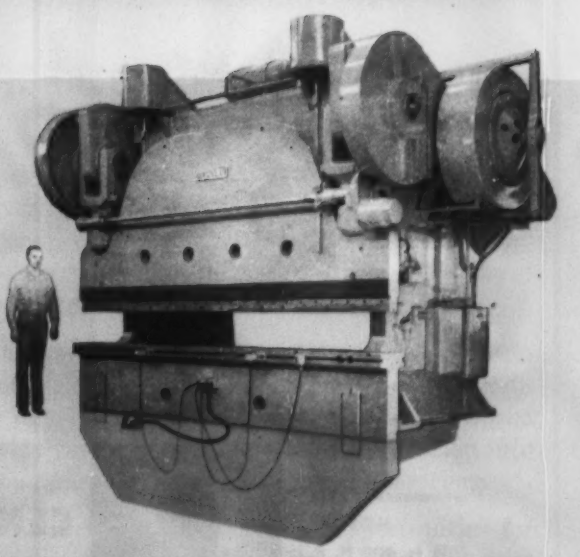
BOOTH 1105

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

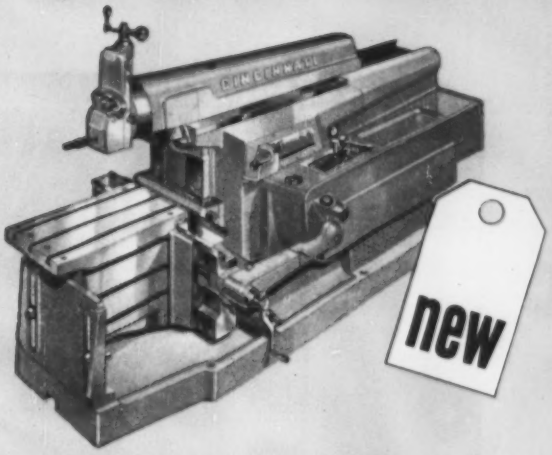


9-115 x 10′ CINCINNATI ALL STEEL PRESS BRAKE, capacity 1/4″ x 10′ mild steel.

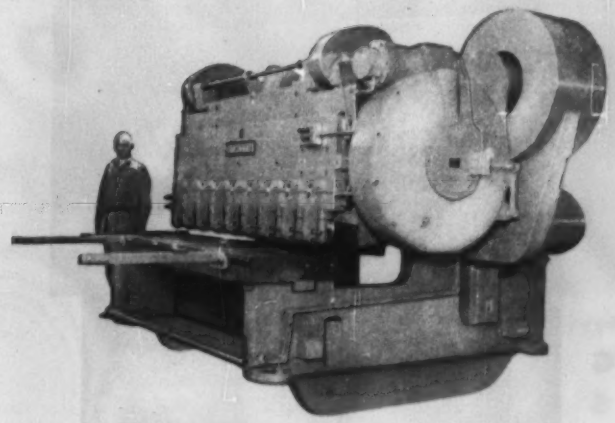


50-900 x 12′ CINCINNATI ALL STEEL PRESS BRAKE, capacity 1″ x 12′ mild steel.

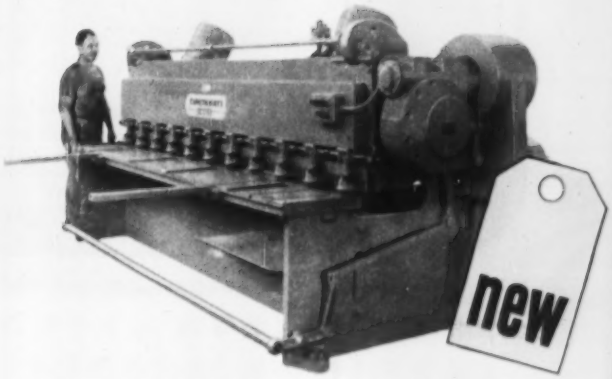
42" CINCINNATI ALL STEEL SHAPER, 16 cutting speeds, 25 to 400 FPM.



16" HEAVY DUTY CINCINNATI RIGID UNIVERSAL SHAPER.



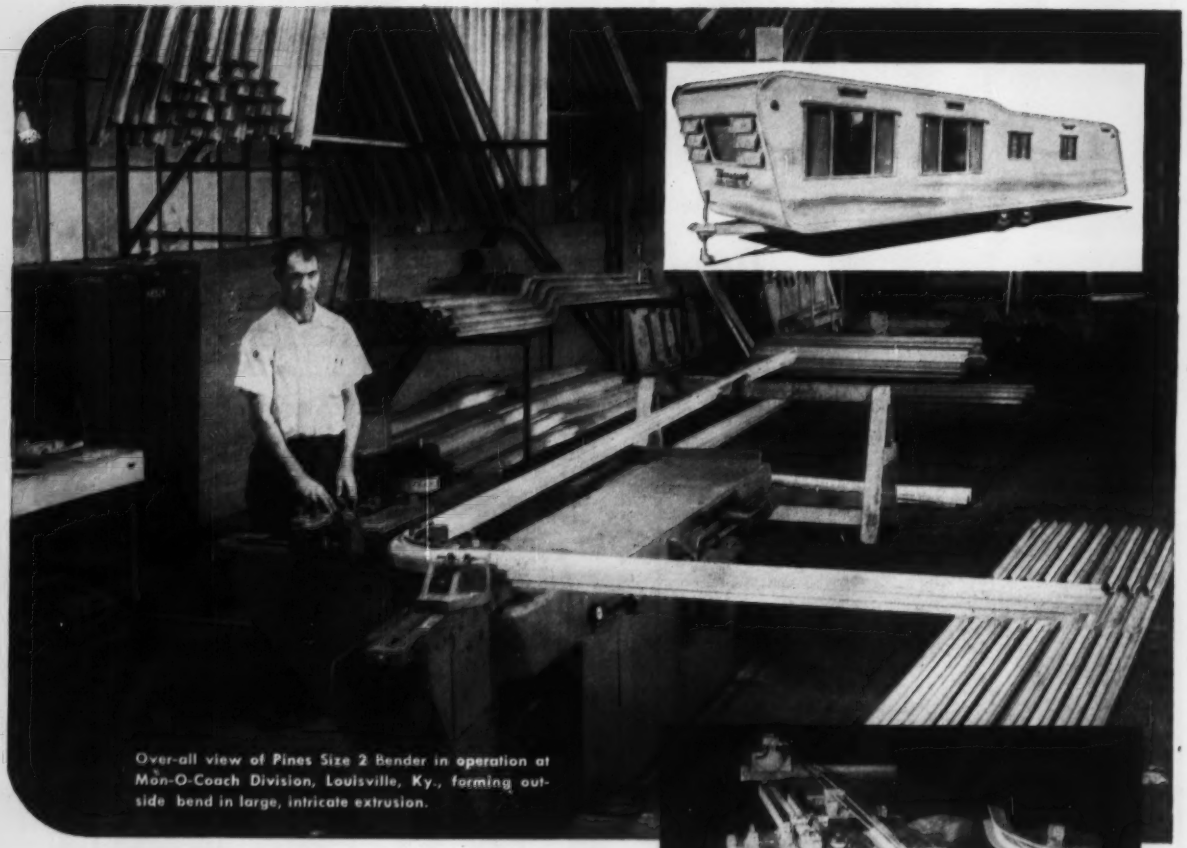
10008 CINCINNATI ALL STEEL SHEAR, capacity 1/" x 8' mild steel.



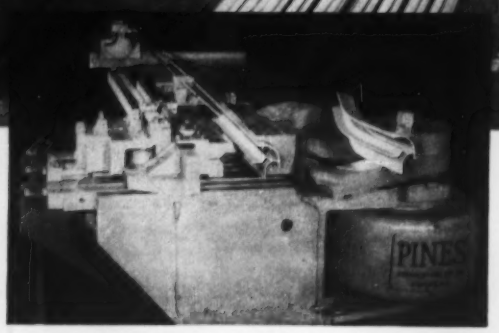
1410 CINCINNATI ALL STEEL SHEAR, capacity 3 16" x 10' mild steel.

2-30 x 5' CINCINNATI ALL STEEL PRESS BRAKE, capacity 30 ton or 14 gauge x 6' mild steel.

3-50 x 6' CINCINNATI ALL STEEL PRESS BRAKE, capacity 50 ton or 10 gauge x 6' mild steel.



Over-all view of Pines Size 2 Bender in operation at Mon-O-Coach Division, Louisville, Ky., forming outside bend in large, intricate extrusion.



▲ View of tooling for making offset bend in opposite direction. Two plug-type mandrels support inner walls. Smooth, neat bends are formed at a bending arm speed of 6.0 r.p.m.

See Us At Booth 555—Production Show—Navy Pier, Sept. 6-16

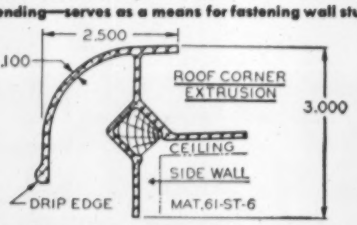
PRODUCTION BENDING ALUMINUM EXTRUSIONS THE "PINES-WAY"

The new, luxurious Mon-O-Coach Mobile Home, manufactured by Mon-O-Coach Division, Ironwood Trailer Coaches, Inc., Louisville, Ky., is a marvel in modern metals engineering. It features all-aluminum structural members which are now cold formed and shaped accurately by production bending methods. Previously, many of the bends were formed by slitting and hand-bending a section, then re-joining the slotted section by welding. Today, a Pines Size 2 Production Bender handles these jobs fast and efficiently.

Slitting and Welding Operations Eliminated

All curved sections are now cold formed in a single operation, including an offset bend in an opposite plane in one of the most ingenious extrusions probably ever developed for the automotive industry. Shown in drawing, this large unique extrusion, incorporating a 5/8" wood section, is a top corner section which serves as a means of fastening top, sides, and front panel members together. Tooling by Pines forms neat, smooth bends without excessive distortion or wrinkling, completing the piece with the wood section in place. Previous slitting and welding operations are eliminated.

▼ Cross-section of Mon-O-Coach's intricate, top corner extrusion. Hollow center incorporates 5/8" wood section installed before bending—serves as a means for fastening wall studdings.



Write FOR MORE DATA

If you would like more data on production bending of aluminum extrusions the "Pines-Way", write for free copies of "Pines News". Or ask for a Pines engineer to call and assist you with any production problem.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery · 662 WALNUT · AURORA, ILLINOIS

PRODUCTION BENDING · DEBURRING · CHAMFERING MACHINERY

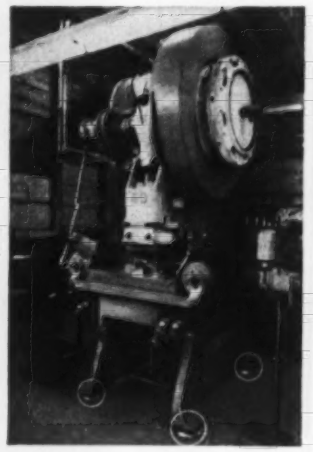
ROBINSON MACHINERY MOUNTINGS

Preferred for Vibration and Shock Control

All-Metal

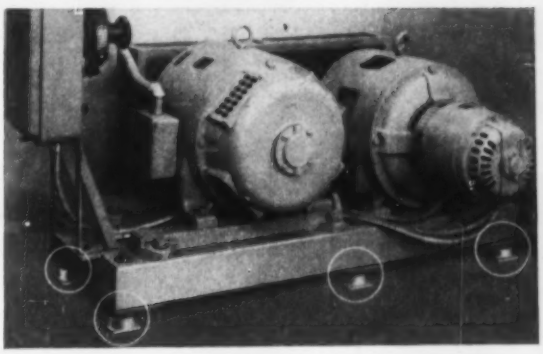
Met-L-Flex*

(TRADE MARK)



*Registered Trade Mark for the All-Metal Met-L-Flex load-carrying resilient cushions fabricated of stainless steel wire which were developed and pioneered exclusively by Robinson Aviation, Inc.

See below for description of mounts utilized.



Robinson Met-L-Flex Mounts, in world-wide use for airborne equipment, have now been adapted to the mounting of machinery. Their use will effect immense economies in time and money.

NO RUBBER — *Deterioration eliminated*

NO LAGGING — *Bolting to floor unnecessary*

QUICK INSTALLATION — *Special tools not required*

MACHINE MOBILITY — *Flexible production lines*

LESS MAINTENANCE — *Machines stay aligned*

LIFETIME PERFORMANCE — *Mounts will not wear out*

MORE STABILITY — *Machines will not walk*

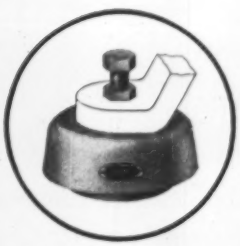
REDUCED NOISE — *Structure-borne rumble eliminated*

CLOSER TOLERANCES — *Product quality improved*

INCREASED OUTPUT — *Faster machine speeds possible*

INCREASED PROFITS — *Fewer rejects*

IMMEDIATE SERVICE — *Less down time for installation*

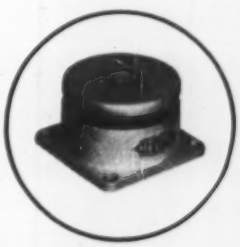


W139 "ADJUST-O-MOUNT". Heavy duty shock and vibration unit mount for rotating industrial machinery. Incorporates advanced leveling feature for quick, simple alignment of machines without the use of special tools.

Recommended for industrial machines, such as grinders, broaching, milling, boring and drilling machines, motors, generators, pumps and compressors. Available in 4 load ranges from 250 to 4000 lbs. per unit. Larger capacities available. Natural frequency: 12-18 c.p.s.

SERIES W300. Heavy duty shock and vibration mount recommended for rotating machinery, presses, generators, pumps, compressors, milling machines and other heavy industrial machinery. Available in 3 load ranges from 100 to 1500 lbs. per unit.

Natural frequency: 12-16 c.p.s.



Send for Bulletin No. 850, "Robinson Vibration and Shock Mounts for Industry", "Trends" sheets Nos. W100 and W101 give engineering information on the 2 mounts illustrated.

ROBINSON AVIATION INC.

TETERBORO NEW JERSEY

Vibration Control Engineers

INDUSTRIAL DIVISION

WEST COAST ENGINEERING OFFICE — Complete engineering design and test service. 3006 Wilshire Blvd. Santa Monica, Calif.

VISIT US AT BOOTH 827 AT PRODUCTION ENGINEERING SHOW

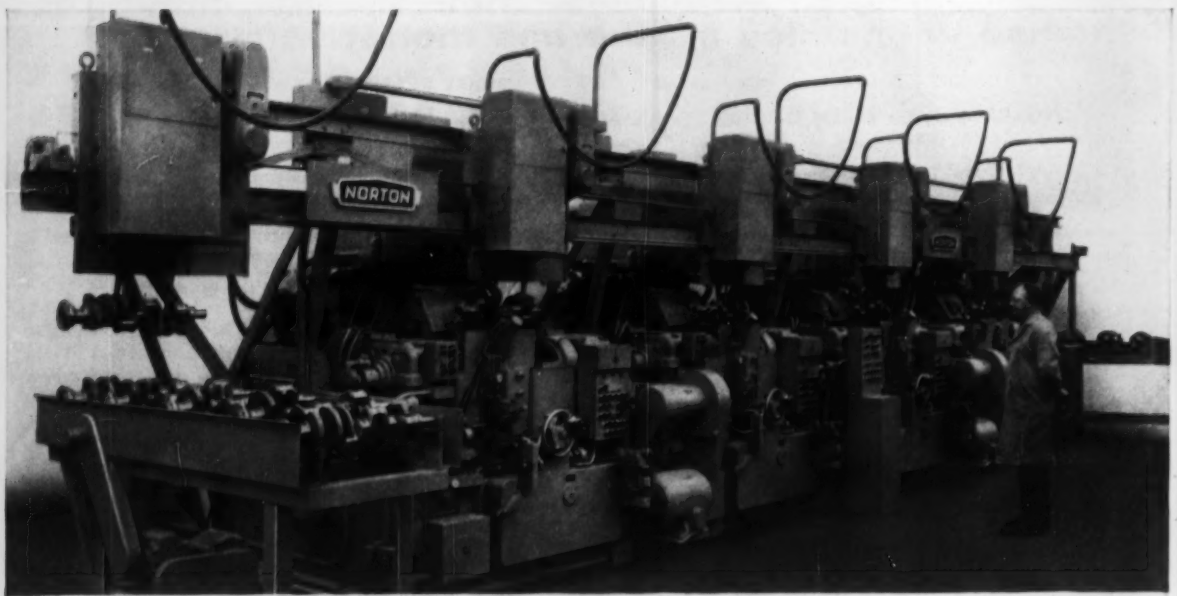
See these Norton machines at the Chicago show

The machines described here will be shown in the Norton exhibit at the Chicago Machine Tool Show — Booth No. 516.

These advanced machines are only a small fraction of the world's largest line. Norton produces a wide range of cylindrical, surface and tool room grinders, lapping machines, crankshaft and camshaft grinders and special types for grinding pistons, valves, jet parts, etc.

Remember, only Norton offers you such long experience in both grinding machines and wheels to bring you the "Touch of Gold" that helps you produce more at lower cost. Why not replace your obsolete grinding and lapping equipment with new Norton machines — and meet competition with the best production tools in the field? See them at the show, call your Norton representative for full details, or write direct.

NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.

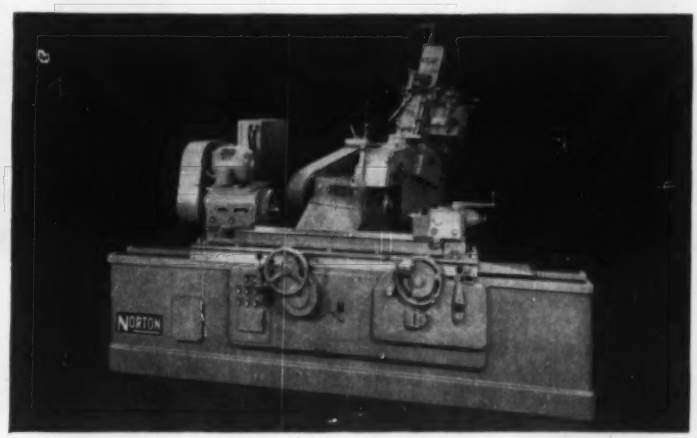


Automation in crankpin grinding . . . another Norton "FIRST"

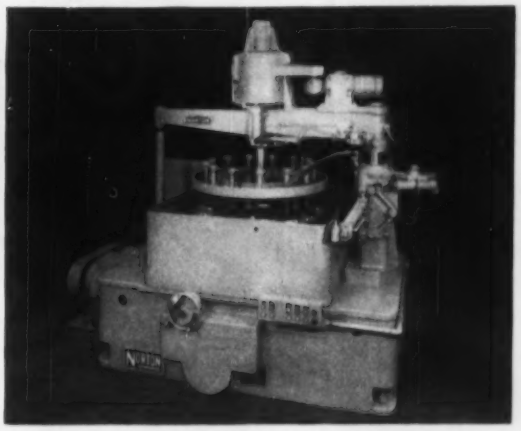
Outstanding in the Norton exhibit at Chicago will be the Automatic Transfer Type Crankpin Grinding Machine. This Norton-engineered advancement grinds pins on automotive type crankshafts completely automatically — eliminating entirely the manual operations of loading, clamping, adjusting, controlling size, gaging and unloading. Savings of time and labor are thus built up for every pin on the shaft.

Movements of the transfer mechanism are electrically controlled, hydraulically operated and completely interlocked to control proper operating sequence.

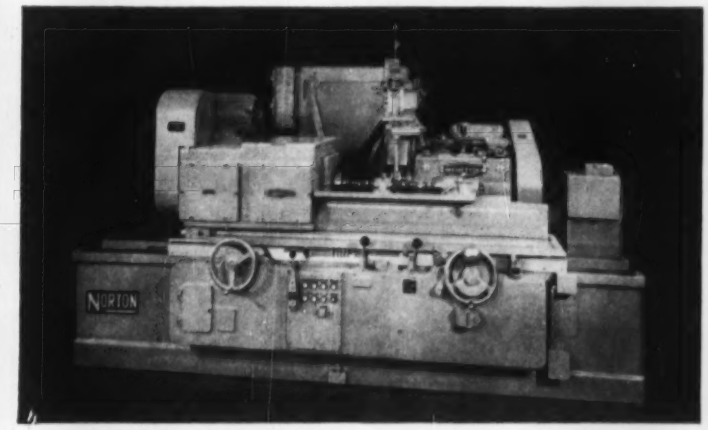
Other Norton automated grinders are on the way. Meet competition with the most economical modernization of grinding methods now available. Norton engineers will gladly discuss complete or partial automation of your grinding operations



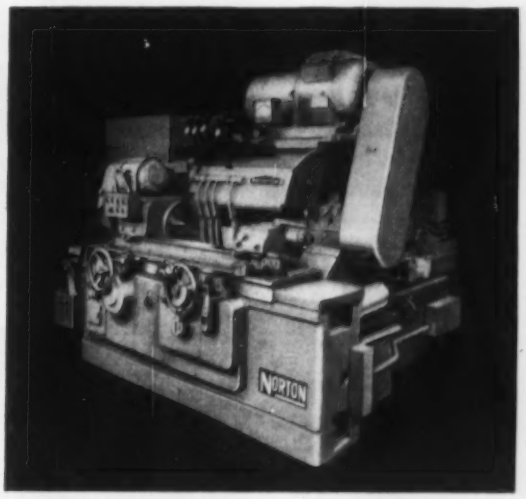
SEMIAUTOMATIC ANGULAR WHEELSLIDE GRINDER — TYPE CV-4. Grinds thrust surfaces and adjacent diameters in one fast automatic plunge grind operation. Eliminates the separate grinds necessary with conventional machines. Operator merely loads, starts automatic cycle, and unloads. Work lengths: 18″, 36″, 48″, 72″.



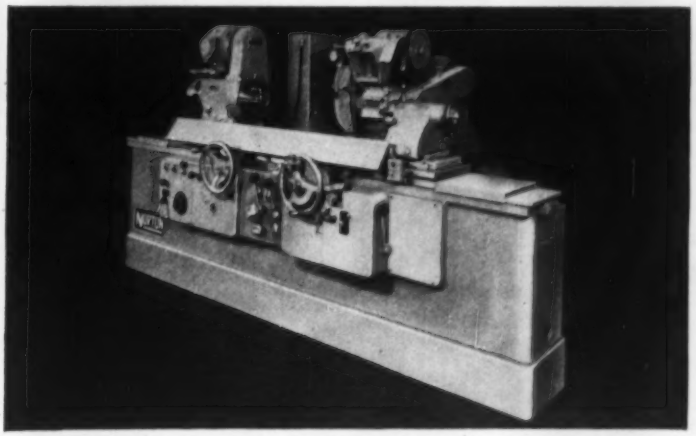
HYPROLAP* HIGH PRODUCTION LAPPING MACHINE NO. 48F. For extremely fast, high production of single or parallel face flat lapping. Bonded abrasive laps produce work pieces free of grit. Arrangements: plain, time cycle . . . automatic continuous feed . . . semiautomatic continuous feed.



CAM-O-MATIC* CAM GRINDER NO. 3. A new, highly advanced automatic machine that sets new standards for production, precision and finish. Solid construction cuts vibration, assures maximum accuracy and service life. Entire operating cycle is geared to split-second efficiency. Capacity for taper-face grinding gives added versatility.



HEAVY DUTY MULTI-WHEEL GRINDER — TYPE CM-1. Makes four or more cuts simultaneously in a single plunge-grind cycle. Operates automatically, under one-lever control. Brings new economy to the grinding of multi-diameter parts such as crank and camshafts, etc. In 10″ x 30″ and 14″ x 30″ sizes.



12″ UNIVERSAL GRINDER — TYPE U-4. Quick, easy set-ups plus fast grinding action over a wide variety of external, internal, face and angular wheelslide grinding jobs. Permanent chuck mounting is one of many advanced features. Work lengths: 36″ and 48″.

Also shown at Chicago will be the Norton 10″ Semiautomatic Cylindrical Grinder — Type CTU. Designed for plunge or traverse type operations, from rough cuts to finest finishing. Production and job shop users report one Type CTU replaces several other machines.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

To Economize, Modernize with NEW

NORTON

GRINDERS and LAPPERS

Making better products... to make your products better

District Sales Offices: Worcester • Hartford • New York Area, Teterboro, New Jersey • Cleveland • Chicago • Detroit

In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

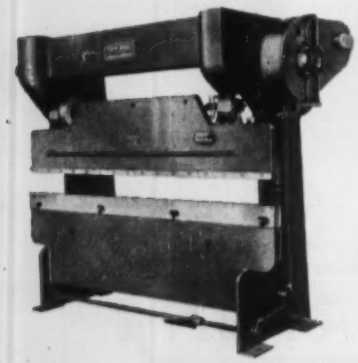
OPEN HOUSE and EXHIBIT

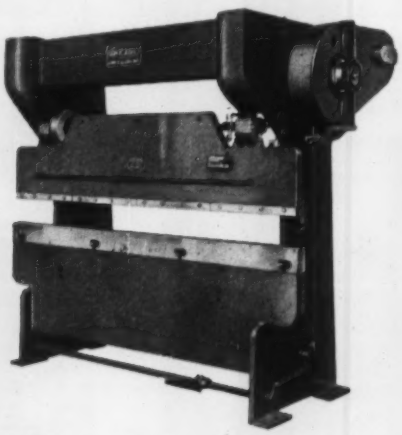
Every visitor to the great Chicago Machine Tool Show and Metalworking Machinery and Equipment Exposition is invited to Dreis & Krump's open house. This open house and exhibit will be conducted every day September 6 to 17, except Saturday and Sunday, from 9:00 A.M. to 5:00 P.M. Especially, those interested in forming, bending, punching, and notching sheet metal and the bending of steel plate for weldments, etc. will find it well worth their while to visit us.

Something new will be on display—shown for the first time—four new models of light duty press brakes. Also we shall have models of all types of CHICAGO equipment to demonstrate the bending of steel plate and the forming and bending of sheet metal. Our engineers will be available to discuss the application of this equipment to your requirements.

Plan now to attend this open house and exhibit.

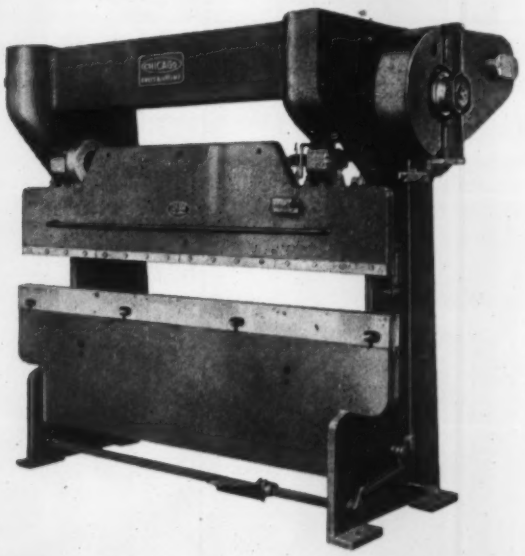
New SERIES A PRESS BRAKE





New SERIES B PRESS BRAKE

New SERIES C PRESS BRAKE



Only 15 Minutes Taxi Ride from International Amphitheater

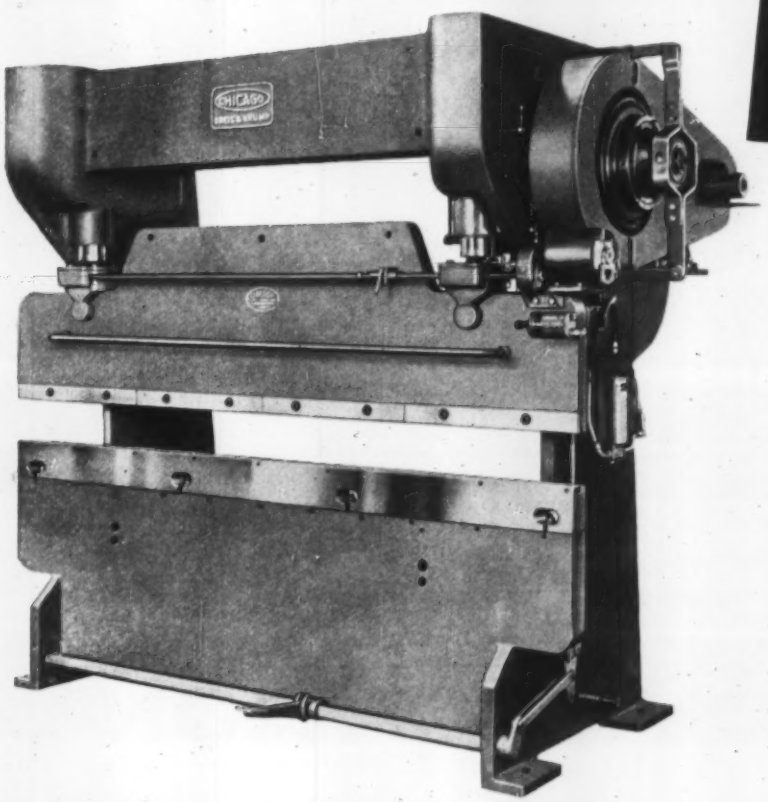
DREIS & KRUMP PLANT

during the

CHICAGO MACHINE TOOL SHOW

September 6-17

Daily 9:00 A.M. to 5:00 P.M.
except Saturday and Sunday



New SERIES L PRESS BRAKE

In Operation

Series D CHICAGO SS Press with 50"x172" die area, set up for performing over 50 punching and notching operations in a single stroke on a sectional cooler panel.

Automation

Series D CHICAGO SS Press set up for continuous automatic production of No. 55 detachable-link sprocket chain—from coiled stock to complete chain without scrap.

And on Display

CHICAGO Standard Heavy Duty Press Brakes

CHICAGO Power Bending Brakes

CHICAGO Power Folder Brakes
Single and Double Wing Models for folding or tangent bending.

CHICAGO Hand Bending Brakes

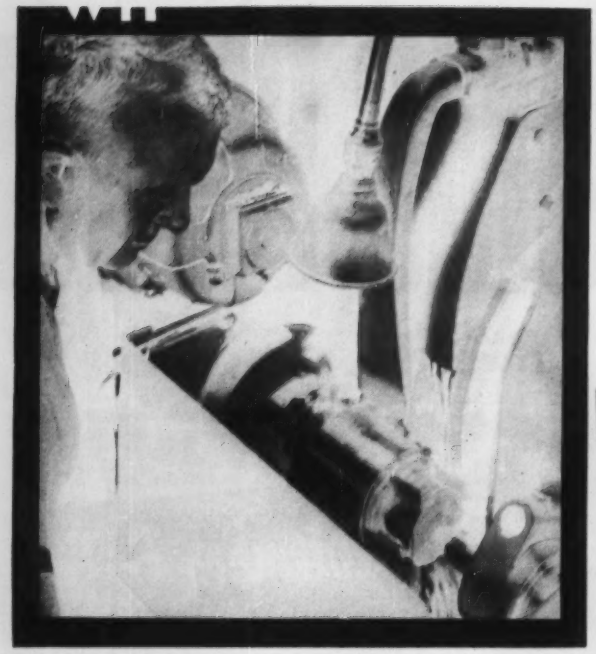
See

Dreis & Krump Press Brake Die Exhibit and Method of Induction Hardening Press Brake Dies for long life.

DREIS & KRUMP

MANUFACTURING COMPANY, 7400 S. Loomis Boulevard, Chicago 36, Illinois

CHICAGO
DREIS & KRUMP



JUST AS A NEGATIVE guarantees you an exact duplication of a photograph each and every time, you are always assured a

A manufacturing achievement that will save you money and increase your production . . .

POSITIVE DUPLICATION of an original grinding wheel every time through the CINCINNATI (PD) Manufacturing Process.

NOW!

Cincinnati Grinding Wheels offer

PD

POSITIVE DUPLICATION

It's the greatest grinding wheel development in years! For through the CINCINNATI (PD) Manufacturing Process you are assured a Positive Duplication of the original wheel *every* time you reorder.

"On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will *act and grind exactly alike. Yet they are priced no higher than ordinary wheels.*

Let us prove to you how CINCINNATI (PD) WHEELS can save you money and increase your production. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

CINCINNATI
Grinding Wheels
THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio

WASHBURN WIRE COMPANY NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

P-K "proving ground" for

ASSEMBLY STRENGTH

The "proving ground" for the holding power of P-K Socket Screws is industry-wide. Millions of assemblies made by thousands of satisfied customers are your assurance that screws made to P-K quality standards meet every test.

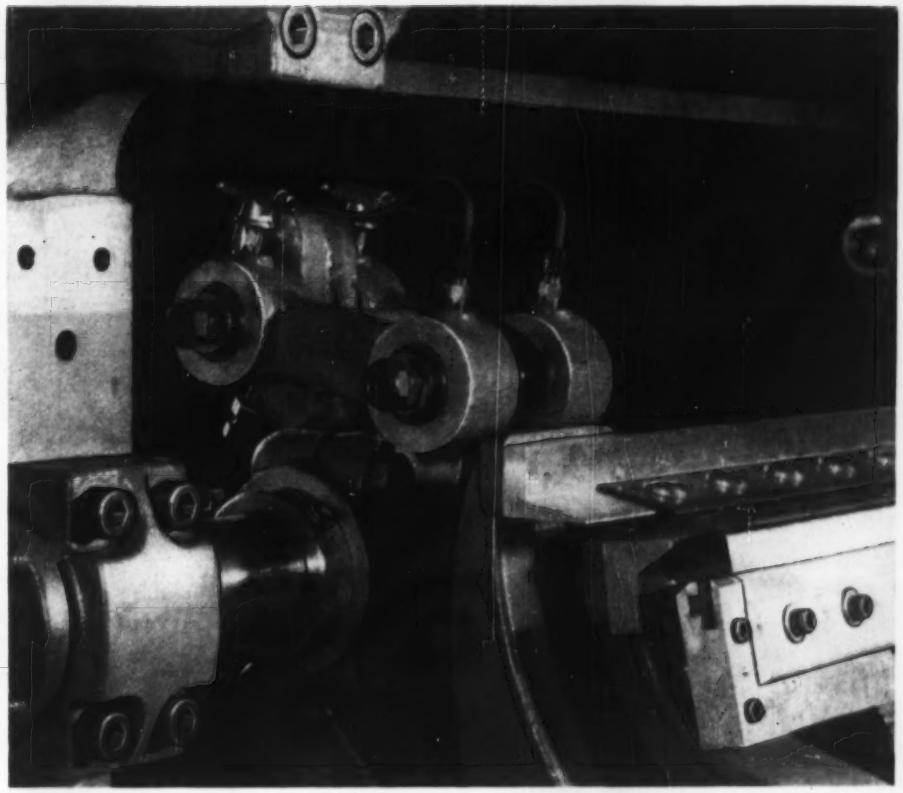
In many of these assemblies, P-K Socket Screws are subjected to extreme conditions of shock and vibration . . . such as ordnance and other products made to exacting demands of the Armed Forces.

Get samples, information from your P-K Distributor, or write: Parker Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14.

PARKER-KALON®

Used by thousands of cost-wise buyers in millions of assemblies . . . to

make planned savings pay off



STAY TIGHT UNDER TOUGHEST CONDITIONS

In the warp knitting machine, above, P-K Socket Screws stay tight under constant vibration. Some of many different P-K Socket Screws used are shown — P-K Cap Screws in shaft bearing pads and needle bar clamps, and P-K Set Screw in collar on needle bar rocker shaft.

For ALL essentials of cost-wise assembly — get P-K Socket Screws

FOR ADVANCED DESIGN that speeds assemblies—makes them simpler, stronger — and saves errors.

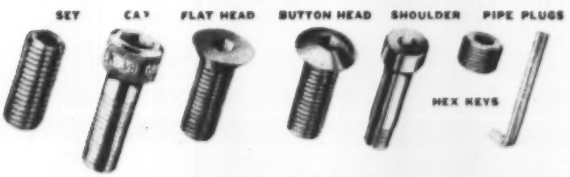
FOR TOP QUALITY and tolerance gaged to your most exacting specifications — and guaranteed.

FOR ASSEMBLY STRENGTH okayed in a million punishing tests by thousands of satisfied users.

FOR PLANNING AIDS and buying data patterned to your special needs, plus advice on assembly.

FOR SUPPLY SERVICE set up for fast action and lower purchasing expense — by local Distributors.

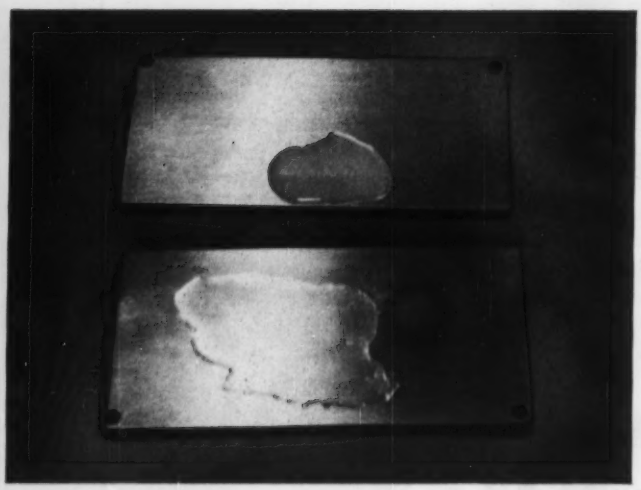
SOCKET SCREWS

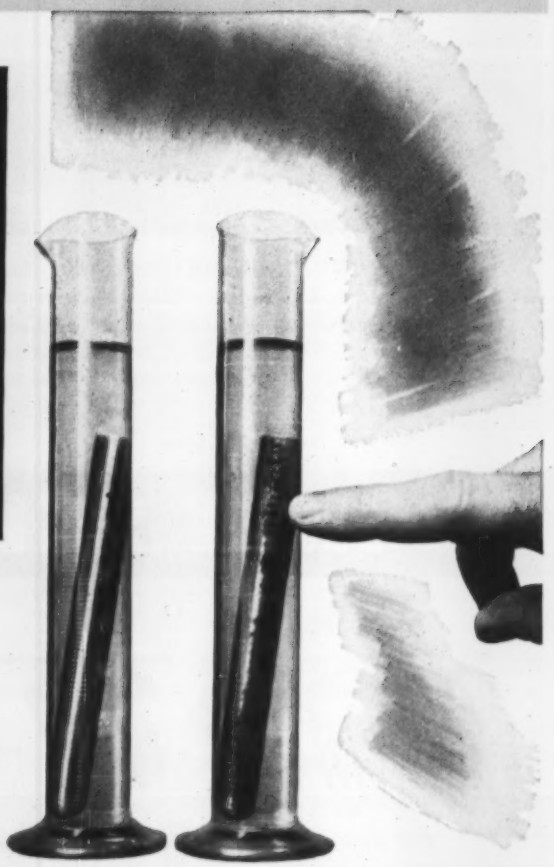


Call your nearby P-K Socket Screw Distributor

Remember **P-K means OK**

Announcing
SHELL
DROMUS OIL E





Above: Cooling action of a cutting fluid is directly related to its wetting ability. Conventional soluble oil emulsion (background) "balls" up. Equal amount of Shell Dromus Oil E spreads out thinly . . . wets far greater area.

Right: Plain carbon steel, if left in water at room temperature for about two hours, will rust as shown. Sample on left was in a 1-30 solution of Shell Dromus Oil E and water *for six months without rusting.*

SHELL DROMUS OIL E

NEW CUTTING OIL

permits higher speeds and faster feeds than ever maintained before

Shell Dromus Oil E, a new solution-type fluid, wets all metal surfaces with extreme rapidity and keeps both work and tools exceptionally cool. These qualities permit an increase of machine speeds and/or feeds far beyond anything allowable with conventional soluble oils.

IT'S MUCH EASIER ON TOOLS

There's much more life in any cutter or abrasive wheel when protected by this new oil. *It stays put* between tool and work. (At a 1-30 dilution, average tool life increase in extended field tests was about 50%.)

IT FIGHTS RUST

Shell Dromus Oil E is readily soluble in hot, cold, soft or hard water, and stable in any concentration. Even at low concentrations, it gives excellent rust protection to all ferrous metals, *including cast iron.*

IT KEEPS WORK COOL

Even at stepped-up production rates, you'll find less heating and better finish wherever this new oil is used.

IT SETTLES OUT FAST

Chips and wheel particles settle out immediately . . . the recirculated fluid is clean and free from contaminating particles. It is *not* sticky or greasy . . . leaves no deposits on machines or work.

IT'S GREAT FOR GRINDING

Grinding wheels remain clean, *even when material retains a film of cutting oil from a previous operation.* Even cast iron can be ground cleanly when Shell Dromus Oil E is used to cool the work.

If all this reads "too good to be true," we suggest that you try Shell Dromus Oil E *on any problem operation you have.* It *is* that good!

SHELL OIL COMPANY

50 West 50th Street, New York 20, New York
100 Bush Street, San Francisco 6, California

SHELL

this 140-TON horizontal milling machine

also bores and turns

There's never been one like it before!

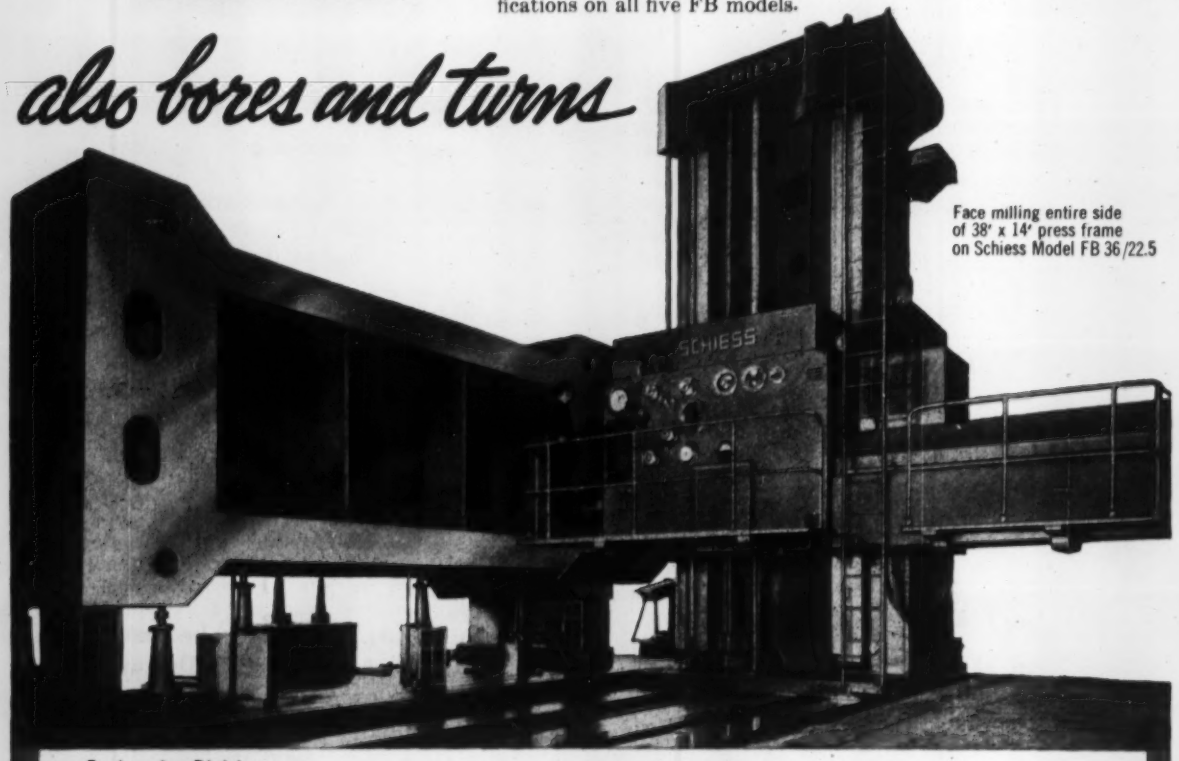
Just a press of a button puts this mighty Schiess into action. A 25-ft. high column moves smoothly along 45-ft. long bedways. Never a vibration—no chatter—even at maximum transversal loads! The new Schiess design of the spindle heads has eliminated this!

THE MILLING OPERATION. A huge tungsten-carbide cutter in a 14¼" spindle goes to work on the stock. And performs its operation with a consistent accuracy—a surface-finish count—never before obtainable on such a big fellow.

THE BORING OPERATION. Another press of a button! Another spindle goes to work—bores a 79" depth in one cut—or a total depth of 118". Boring and milling spindles are provided with 36 speeds of which the top 12 are V-belt transmitted. Rapid traverse, feeds and manual controls of the two spindles are completely independent.

That this mighty machine has tremendous productive capacity is self-evident. And its productivity goes far beyond conventional milling and boring. Schiess attachments increase its scope to taper-milling, thread-cutting, copying and, in certain instances, copying in 3 dimensions. It's a time saver, too. Can go from feed to rapid traverse immediately, without complicated adjustments.

The Schiess Model FB 36/22.5 Horizontal Milling and Boring Machine is a product of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess Engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on all five FB models.



Face milling entire side of 38' x 14' press frame on Schiess Model FB 36/22.5

Engineering Division
AMERICAN SCHIESS CORPORATION
1232 Penn Avenue, Pittsburgh 22, Pennsylvania

Sole Distributor
KO KURT ORBAN COMPANY, INC.
34 Exchange Place, Jersey City, N. J.

THE FERRY CAP

countr-bor

Trademark

SCREW

12-POINT HEAD

A NEW, REVOLUTIONARY DESIGN
FOR SOCKET HEAD SCREW APPLICATIONS

OFFERING THESE
NOTEWORTHY ADVANTAGES:

1. Takes standard 12-point socket wrench.
2. External wrenching instead of internal.
3. Stronger—more gripping surface.
4. Permits greater wrenching torque.

Packaged goods being readied for distributors

In brief—a quality product which will do everything required of socket head screws—and more. For all counterbore applications.

Wherever the Ferry Cap Countr-Bor Screw has been tried, users are enthusiastic—saying that these screws are a service man's dream and the best development in socket screws in recent years. They will help you lick tough assembly problems where socket screws are required.

We shall be glad to send samples, prices and complete information promptly upon request.

Ferry Cap Countr-Bor Screws
PATENT APPLIED FOR
MANUFACTURED SOLELY BY

THE FERRY CAP & SET SCREW COMPANY
2139 Scranton Road • Cleveland 13, Ohio

doesn't this make good sense to you...
The same HOUGHTON PRODUCTS that perform so well in machine tools operated at the Show will also work to best advantage in your plant!

As a machine tool operator you have one thing in common with the machine tool manufacturer:

You both want the most efficient performance you can get!

So it *does* make sense to use the same high quality Houghton lubes, greases, coolants, cleaners and rust preventives used by so many exhibitors at the Machine Tool Show.

All you need do to benefit from these same products is to *try them!* You'll also like the experienced on-the-job service you get.

See the Houghton Man at Booth 318 or write for bulletins, to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

These Products will Make Sense in Your Shop, too!

COOLANTS AND CUTTING OILS *for dependable metal cutting* Houghton supplies a complete line of water soluble coolants compounded and fortified to provide maximum production, outstanding tool life and the finish you want. You can be sure of getting every possible unit of production from your machines with Houghton cutting fluids.	**"HOUGHTO-GRIND"** *for most efficient oil-free grinding* This oil-less grinding compound is rust-inhibitive when mixed with high dilutions of water. There's no oil to separate and load up wheels, so glazing and grinding checks are eliminated. Low-cost, too, in dilutions up to 200 parts water.	**"WAY LUBRICANTS"** *that won't "slip-stick"* Chatter, galling and excessive wear of machine ways are eliminated when Houghton Way Lubricants are on the job. They are high in lubricating properties and low in friction. They provide high film strength and a marked affinity for metal. You can smooth-out the operation of your machine tools with Houghton Way Lubricants.
"HOUGHTO-CLEAN" *for cold cleaning of metals* Room temperature metal cleaning compounds for production lines; make costly heating equipment unnecessary, keeps department cooler, worker morale higher, cleaning costs down, safe and effective.	**"HYDRO-DRIVE"** *Fortified Hydraulic Oil* Hydro-Drive has everything a hydraulic oil needs: selective viscosity for efficient operation and high viscosity index; high film strength that prevents wear; oxidation stability that keeps it on the job for years and contains solvent properties that keep the system clean.	**HOUGHTON "RUST-VETO"** *for maximum rust prevention* From indoor corrosion protection of highly finished parts to outdoor rust prevention for machinery and dies, RUST-VETO was first in the field—and still is. A wide range to meet industrial and government "specs".

. products of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

SEE HOUGHTON'S HYDRAULIC DISPLAY AT THE SHOW— OILS, FLUIDS, ADDITIVES AND PACKINGS BOOTH 318

SEE 11 PROFIT-MAKING

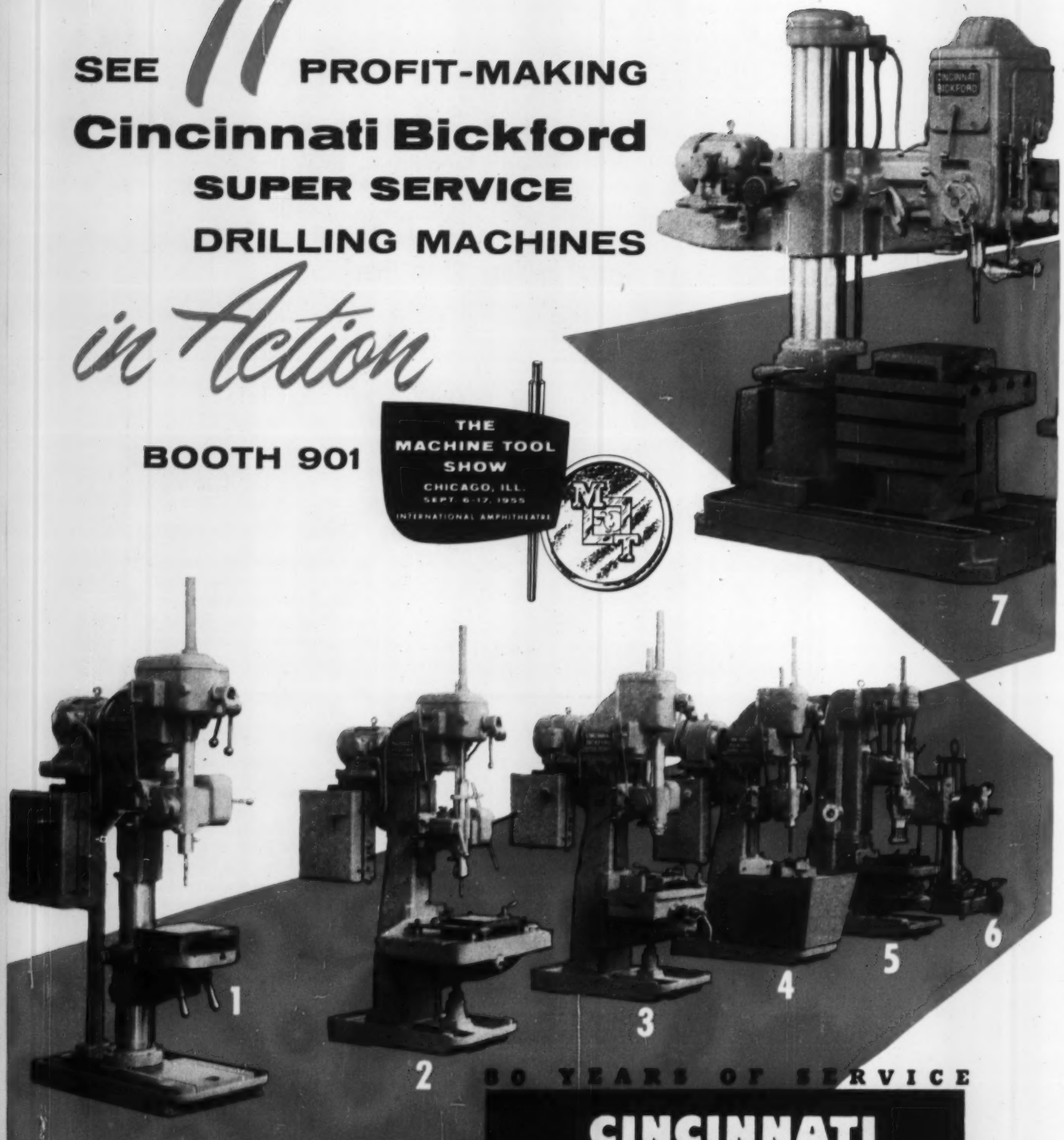
Cincinnati Bickford

SUPER SERVICE DRILLING MACHINES

in Action

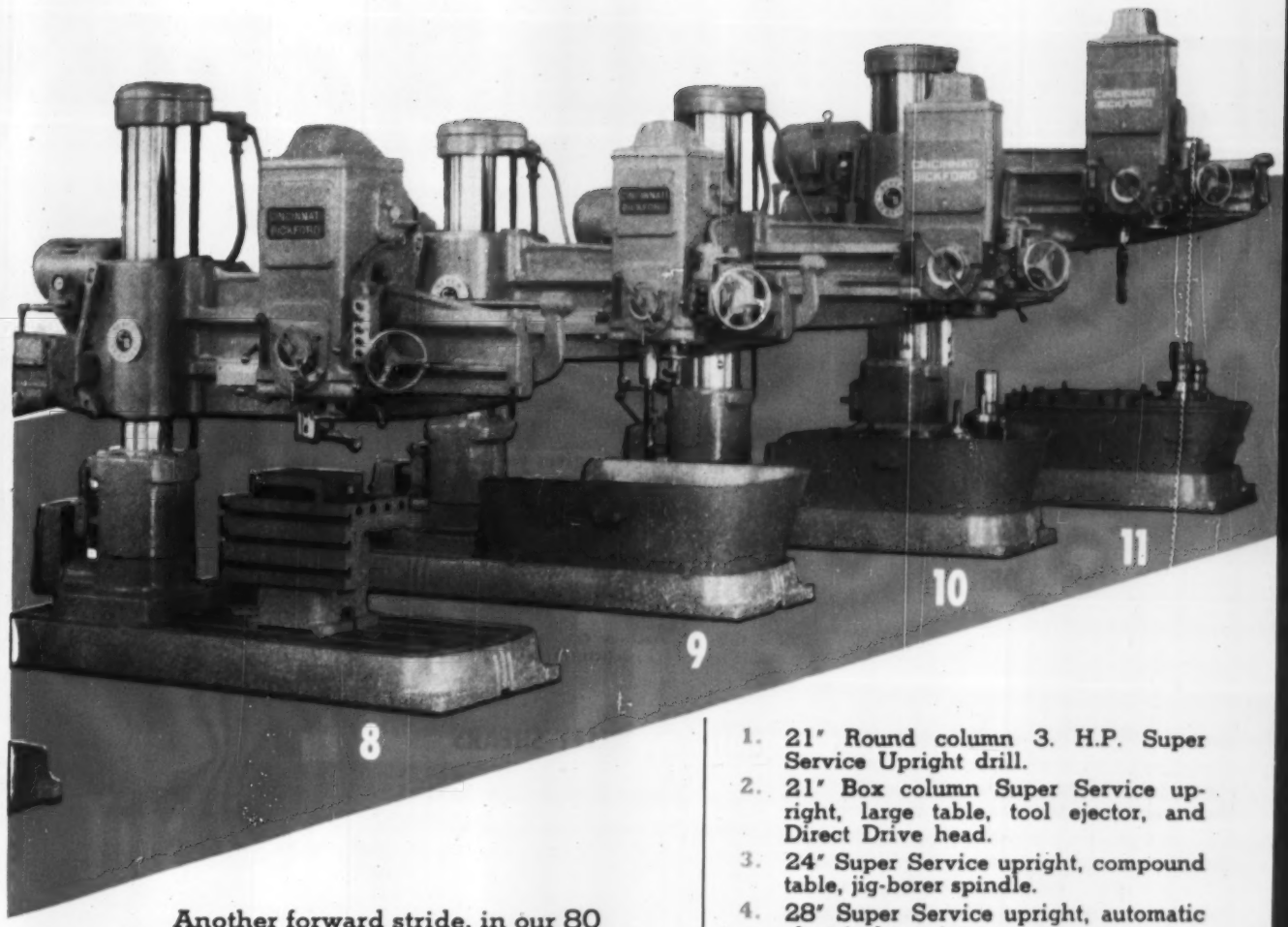
BOOTH 901

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE



80 YEARS OF SERVICE

CINCINNATI BICKFORD



Another forward stride, in our 80 years of drilling machine development, is today's introduction of the new hydraulic preselector for all speeds and feeds on Super Service radial drills.

See it . . . and the startingly simple prescheduling arrangement.

See the new 12 speed head Super Service radial with 9″ diameter column, or 11″ column and 5 or 7½ H.P.

See new cost cutting features on Super Service Upright drills . . . 11 machines in operation at Booth 901.

1. 21″ Round column 3. H.P. Super Service Upright drill.
2. 21″ Box column Super Service upright, large table, tool ejector, and Direct Drive head.
3. 24″ Super Service upright, compound table, jig-borer spindle.
4. 28″ Super Service upright, automatic electrical tapping reverse.
5. 28″ Direct Drive upright, flanged quill, drill head.
6. Portable horizontal drill, 1½ H.P., 6 speeds.
7. 3′ arm 9″ column high speed Super Service Radial, automatic tapping reverse, 9 speeds. 4 feeds, 3 H.P.
8. New 4′ arm 9″ column Super Service Radial, 12 speeds, 6 feeds, 5 H.P.
9. New 4′ arm 11″ column Super Service Radial, power head traverse, 12 speeds, 6 feeds, 7½ H.P.
10. New 5′ arm 15″ column Super Service Radial featuring hydraulic speed range preselector, 36 speeds, 18 feeds.
11. New 6′ arm 19″ column Super Service Radial, hydraulic 100% preselection of 36 speeds and 18 feeds . . . and a unique prescheduling device.

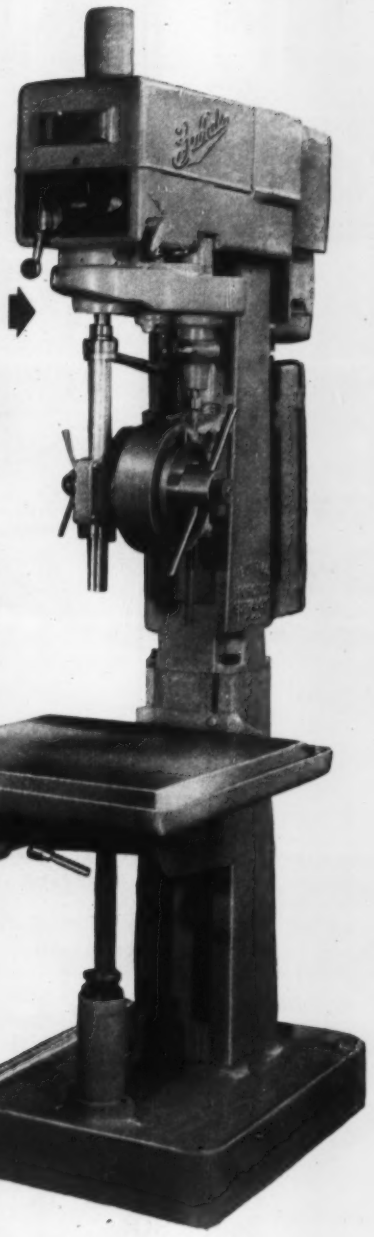
RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

NEW for the SHOW!

"Buffalo" "RPMster" – the new standard in drilling



You wouldn't believe a drilling machine could be so smooth operating — so versatile — so easy to handle as this great new "RPMster" until you see it in Booth 610 at the Show! Its unique new gearless drive gives you any spindle speed from 100 to 3000 R.P.M.'s in *seconds*. It's a real contribution to lower drilling costs!

"Buffalo" DRILLS

At Booth 610, you can see and try four of the six types of "Buffalo" Drills engineered for lower drilling costs.

"Buffalo" STRUCTURAL IRON WORKER

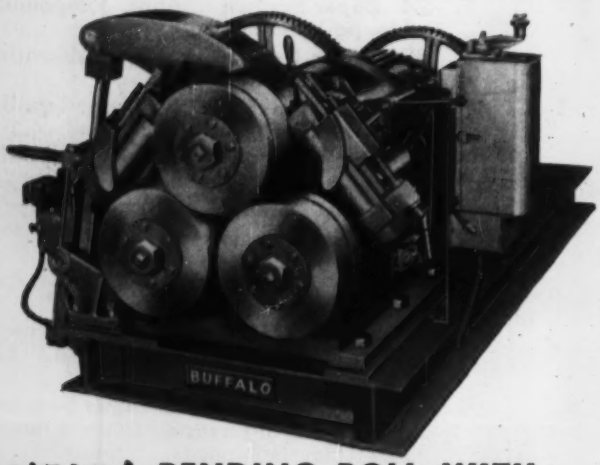
See this big machine cut, notch, cope and shear BIG structurals — easily, rapidly!

"Buffalo" UNIVERSAL IRON WORKERS

These "one-machine fabrication shops" will be on display at Booth 610. See how they could be making money for *you*.

"Buffalo" BILLET SHEARS

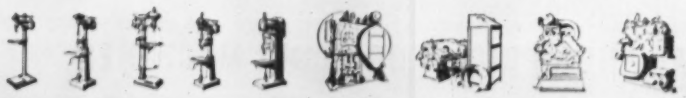
Here will be unveiled for the first time a totally NEW "Buffalo" Hydraulic Billet Shear. You won't want to miss it!



NEW! BENDING ROLL WITH HYDRAULIC ROLL LIFT

The very latest development in fast, easy, low-cost bending of arcs, circles and spirals! Its upper roll is lowered and set or quickly released hydraulically for big time savings.

See them all turning out the WORK at Booth 610!



ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

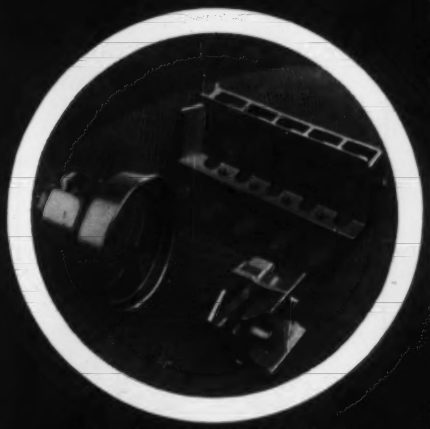
BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

THE MACHINE TOOL SHOW

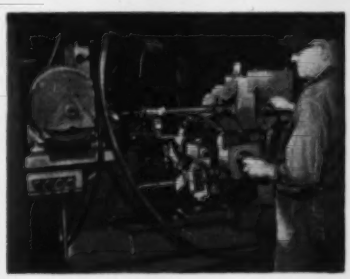


Titan brass pressure die castings

Titan brass and bronze forgings

Titan brass and aluminum hand screw machine parts

One of Titan's modern automatic chucking machines for preparing brass and aluminum forgings to customer specifications. Titan performs all types of machining operations.



Accurately machining a Titan forging on a turret lathe. Titan fabricating operations cut customers' assembly costs.

Titan machined parts

have sparkle, economy and versatility

Appeal and usefulness of brass or aluminum forgings and pressure die castings are increased greatly by multiple drilling, reaming, tapping, gang-milling, turning, broaching or knurling at the skilled hands of Titan machinists.

Equipment includes turret lathes and automatic chucking machines for producing finished machine parts of volume, quality, economy and superb finish. For example, high-quality forgings are supplied by Titan ready for assembly—already precision-broached and gang-milled with multiple-drilled and tapped holes.

When smaller quantities of fabricated parts are needed, Titan hand screw machine facilities come into play. Here, holding to closest tolerances and precision requirements is regular practice.

Let us suggest how Titan machined parts may solve your assembly problems and cut costs. Write for more information. And send for new 40-page full-color booklet "Behind the Scenes." Use the coupon below.

Titan

METAL MANUFACTURING COMPANY

Bellefonte, Pa. Offices and Agencies in Principal Cities

Dept. C

Titan Metal Manufacturing Co., Bellefonte, Pa.

Gentlemen: Please send 40-page booklet "Behind the Scenes."

Name_____

Title_____

Company_____

Street_____

City & State_____

The man who needs a new machine tool and doesn't buy it is paying for it anyway...

in obsolete techniques

How can you tell when a machine or a process is obsolete?

Suppose you buy another machine of the same model that has been doing a satisfactory job. Do you know whether a different, more recently developed machine tool would do your work more accurately, faster, cheaper?

There is one sure way to keep up on developments and improvements—talk frequently to machine tool builders. Discuss your problems with their field engineers. It is their business to help you—to give you the benefit of their specialized experience.

Take Microhoning*, for example. Each year sees tremendous strides in applying this low-velocity abrading process to the problems of industry, through new machines and new techniques developed as new problems arise. Micromatic maintains the world's largest staff of honing specialists and has been responsible for every major development in honing in the past 25 years.

So if you're not in close touch with our representatives as well as with other tool engineers, you may be paying now, in obsolete techniques, for the new machine tools you don't have.

PART:

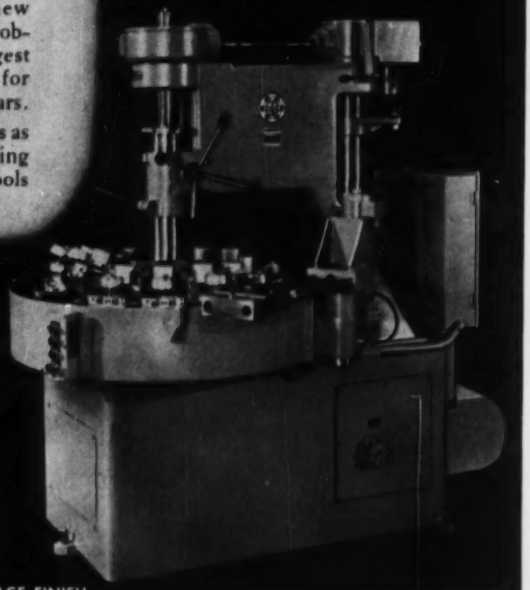
Valve body (automatic transmission) of die cast aluminum.

PROBLEM:

To produce flat surfaces that will hold a seal when assembled without gaskets. High production required.

SOLUTION:

Microhoning removes .001" – .002" stock to generate flatness within .0002" and mat finish that hold required pressure. Production 1200 parts per hour.



*MICROHONING = STOCK REMOVAL + GEOMETRY + SIZE CONTROL + SURFACE FINISH

MICROMATIC HONE CORPORATION

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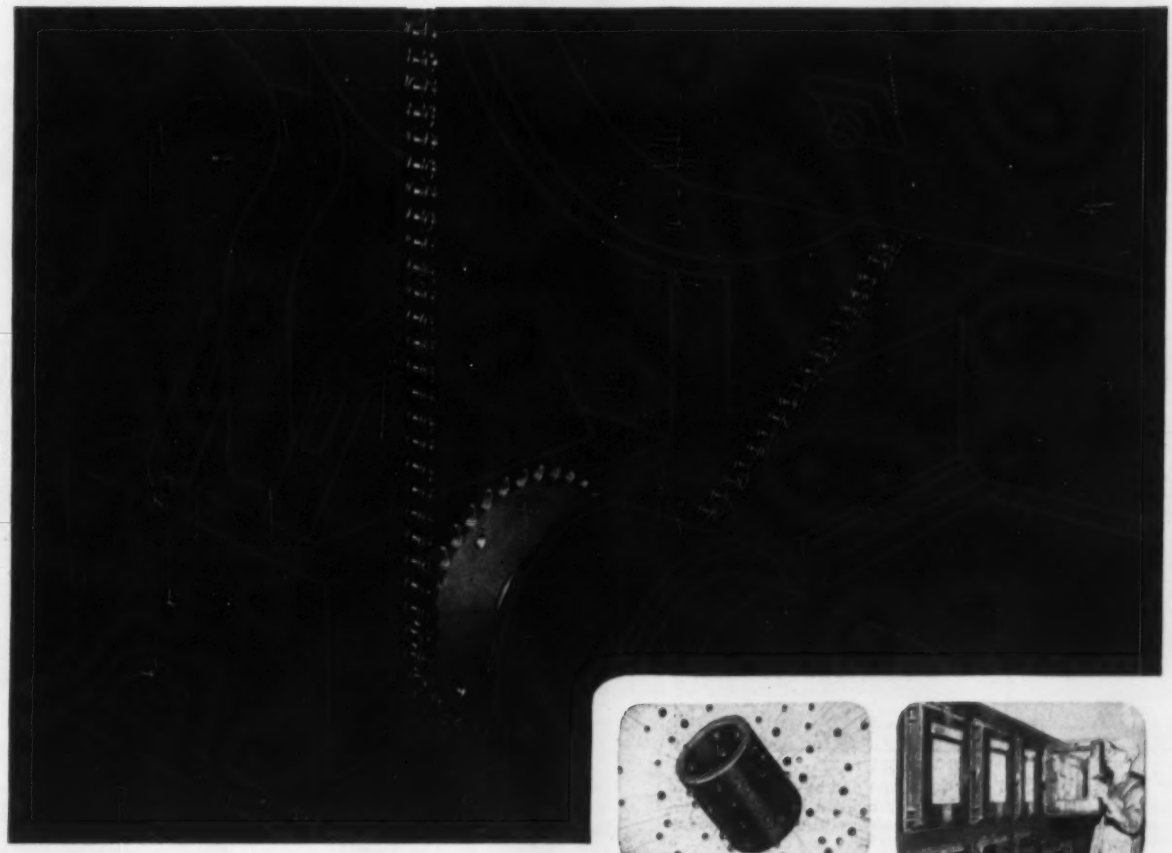
REPRESENTATIVES IN ALL PRINCIPAL COUNTRIES

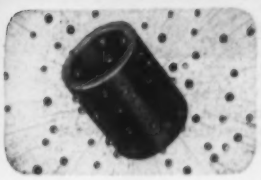
MICRO-PRECISION DIVISION • 2205 Lee Street, Evanston, Illinois

Hydraulic controls • Diesel fuel injection equipment

Visit Booth 1211 at the Show. See demonstrated how Microhoning replaces obsolete techniques.

How these EXTRAS* make roller chain last longer





SHOT-PEENED ROLLERS have greater fatigue life, added ability to withstand impact.

CLOSER HEAT-TREAT CONTROL — coupled with rigid testing insures uniformity.

LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.

PRE-STRESSING of multiple width chain provides uniform load distribution.

*And you pay no premium for these LINK-BELT extras

THERE'S more to roller chain than just the parts you see. *Much more!* It's the hidden extras—standard on Link-Belt Precision Steel Roller Chain—that add up to longer life and lower costs.

Check the four extras shown here. Then for your demanding drive and conveying jobs, choose from the complete line of Link-Belt roller chains and sprockets: Single or multiple widths, ¼″ through 3″ pitch. Double pitch, 1″ through 3″. There's full ordering and application information in 148-page Data Book 2457. Ask your Link-Belt office or distributor for a copy today.

LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

"See our Exhibit — Production Engineering Show — Chicago — September 6-16"

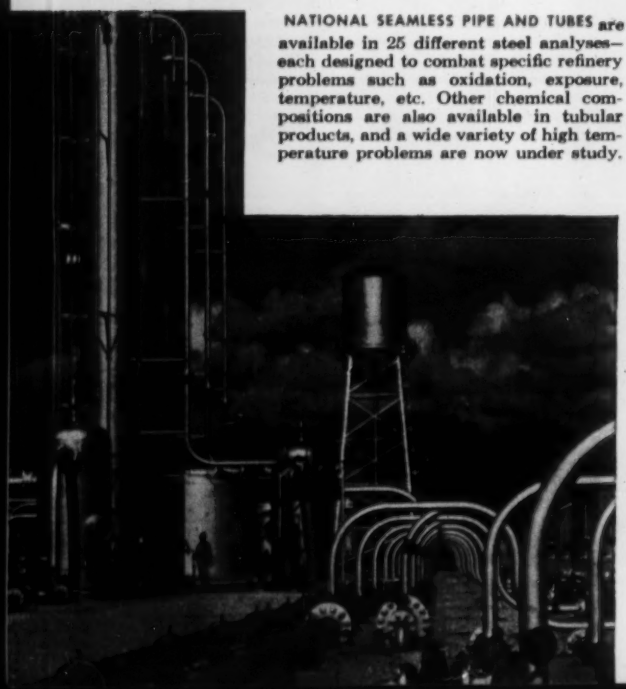
BACKBONE OF A NATIONAL

NATIONAL SEAMLESS TUBULAR STEEL PILES provide low cost for higher loads. Not only by shape and steel strength are pipe piles outstanding, they also provide a hollow form for filling with concrete. The sum of these qualities gives National Seamless Pipe Piles low cost for high bearing capacity.

THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.

THE TOUGH SWEENEY POWERENCH has geared action for tightening or loosening nuts on dual wheels, aircraft propeller shafts, diesel engine cylinder heads, etc. The strength, uniformity, and dimensional accuracy of Seamless Tubing make it ideal for the manufacture of these rugged tools.

NATIONAL SEAMLESS PIPE AND TUBES are available in 25 different steel analyses—each designed to combat specific refinery problems such as oxidation, exposure, temperature, etc. Other chemical compositions are also available in tubular products, and a wide variety of high temperature problems are now under study.



HUNDRED INDUSTRIES...

Seamless Pipe and Tubes

Whether you are manufacturing heavy-duty lug wrenches or erecting vast refineries, you'll want pipe and tubes that possess great strength . . . insure long life and complete dependability. In short, you'll want USS NATIONAL Seamless Pipe and Tubes.

NATIONAL Seamless combines to the highest degree the desirable qualities of strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes machine cleanly, weld readily, and promise smooth installation and long satisfactory service. Available in a complete range of steel analyses, wall thicknesses and diameters, every foot of NATIONAL Seamless is produced to exacting standards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Regardless of the application, our engineers are interested in discussing the problem with you.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

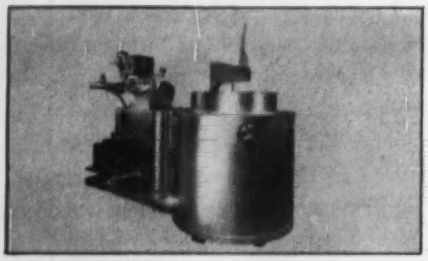
USS National Seamless Pipe and Tubes

UNITED STATES STEEL

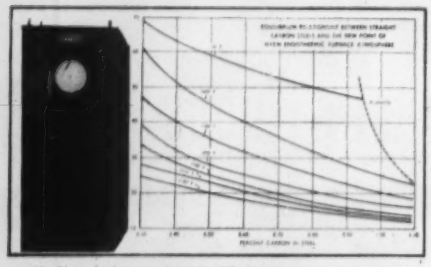
POWER UNITS AND HEAT TRANSFER EQUIPMENT call for thin-walled, smooth-surfaced tubes that offer the *least* resistance to the flow of heat, yet the maximum resistance to pressure. One material possesses the ideal combination of properties for this type of service—Seamless Steel Tubes.

MASTS AND BOOMS OF NATIONAL SEAMLESS are widely used by the shipbuilding industry because they are extremely strong and rigid, yet comparatively light—easy to raise and maneuver. Their swaged and shrunk joints prevent slipping or telescoping.

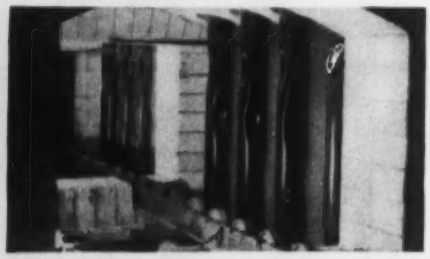
HERE AT LINDBERG WE'RE GETTING YOU ABOUT A GREAT NEW FURNACE



The famous Lindberg Cyclone Furnace has been reducing costs and improving quality of tempering, annealing, nitriding, stress-relieving and nonferrous heat treating for 20 years.



Lindberg dew-point equilibrium curves accurately determine carbon potential in endothermic atmospheres and Lindberg Carbotrol unit controls these values automatically.



The Lindberg vertical radiant tube is only 59 in. long, weighs only 29 lbs. Easy to change. Exclusive "dimple" design insures combustion over length of tube.

There's real furnace news coming from Lindberg.

When metal needs heat Lindberg, over the years, has consistently pioneered better ways to apply it. A revolutionary new development to be announced in September climaxes a long list of Lindberg firsts.

In 1935 Lindberg's famous Cyclone furnace replaced radiation convection with high speed 100% forced convection.

The world's first high temperature (2200° F.) Hyen (endothermic) gas generator was introduced in 1942.

1943 saw 100% high speed convection pushed up into the high temperature field (1750° F.).

The introduction of the two-chamber aluminum induction melting furnace came in 1947.

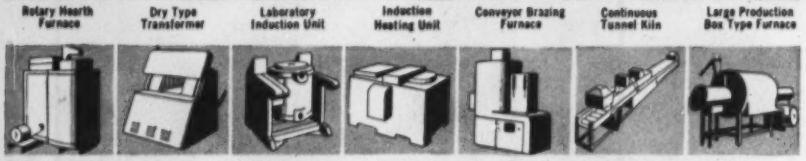
In 1948 Lindberg developed the first high frequency method for measuring carbon and sulphur in steel.

An enamel-coated alloy, vertical radiant tube, providing fast heat release in relatively short length for carbonitriding and carburizing, was brought out in 1953.

In 1954 Lindberg released the first comprehensive set of dew-point equilibrium curves to determine accurately carbon potential in endothermic atmospheres and also introduced the Lindberg Carbotrol unit to control these values automatically.

You can continue to look to Lindberg for the improvement of the processes of applying heat industrially. Particularly, watch for the announcement next month of one of the most revolutionary developments ever made in the furnace field.

Rotary Hearth Furnace | Dry Type Transformer | Laboratory Induction Unit | Induction Heating Unit | Conveyor Brazing Furnace | Continuous Tunnel Kiln | Large Production Box Type Furnace



Pit Type "Cyclone" Tempering Furnace | Laboratory Box Furnace | Nose Pouring Melting Furnace | Induction Melting Furnace | Hyen Generator | Roller Hearth Furnace | Hydrogen Atmosphere Furnace

Lindberg manufactures many kinds of equipment in the industrial heating and related fields. A few of these are symbolized here. If you are interested in any of these, please write us for the specifics on them, or get in touch with your nearest Lindberg Field Engineer. (See your classified telephone book.)

Associate Companies: Lindberg Industrial Corp., Chicago • EFCO-Lindberg, Ltd., Montreal • Lindberg Italiana, Milan • The Electric Furnace

READY TO TELL DEVELOPMENT!

Here at Lindberg, engineers and technicians have been working for months on a development that we believe is one of the most important in the industrial furnace field. We can't tell you all about it until September but we are so sure that it is important news to everyone working with metal that we are giving this advance notice of what's coming from Lindberg. Look for the announcement in September trade papers or, if you're in Chicago September 6 to 16 for the big shows, arrange to see this development at one of the special showings in our plant.

We are planning a series of showings of this new development at our plant during the period of the three Chicago Shows, September 6 to 16. If you are in Chicago, phone MOnroe 6-3443 and we'll make arrangements for your attendance at one of these showings.

LINDBERG ENGINEERING COMPANY

2441 West Hubbard Street, Chicago 12, Illinois

Los Angeles Plant: 11937 Regentview Ave., at Downey, California

Company, Ltd., Weybridge, Surrey, England · Etablissements Jean Aubé, Paris · Lindberg Industrie Ofenbau, Gross Auheim, Germany

This 8-page illustrated booklet brings you up to date on the latest features in Waterbury Farrel's multiple station pillar presses. It explains the design improvements which provide greater efficiency, easier operator control, increased flexibility and economy of operation.

Includes complete table of specifications and capacities for six press sizes. Also covers accessory equipment such as straighteners, feeders, scrap winders, etc.

To get your copy, use the coupon or drop a line on your letterhead.

SOME OF THE MANY TYPES OF WATERBURY FARREL METALWORKING MACHINERY POWER PRESSES — Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc. **MILL MACHINERY** — Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. **WIRE MILL EQUIPMENT** — Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers • Swagers Bull Blocks • String-up Machines • Spoolers, etc. **COLD PROCESS BOLT & NUT MACHINERY** Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc.

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Waterbury, Connecticut
Branch Offices: Chicago, Cleveland and Millburn, N. J.

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Gentlemen: Please send me my free copy of your Multiple Plunger Pillar Press Booklet.

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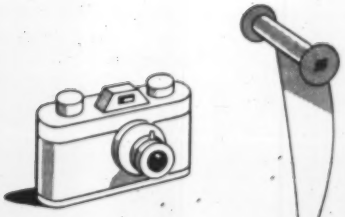
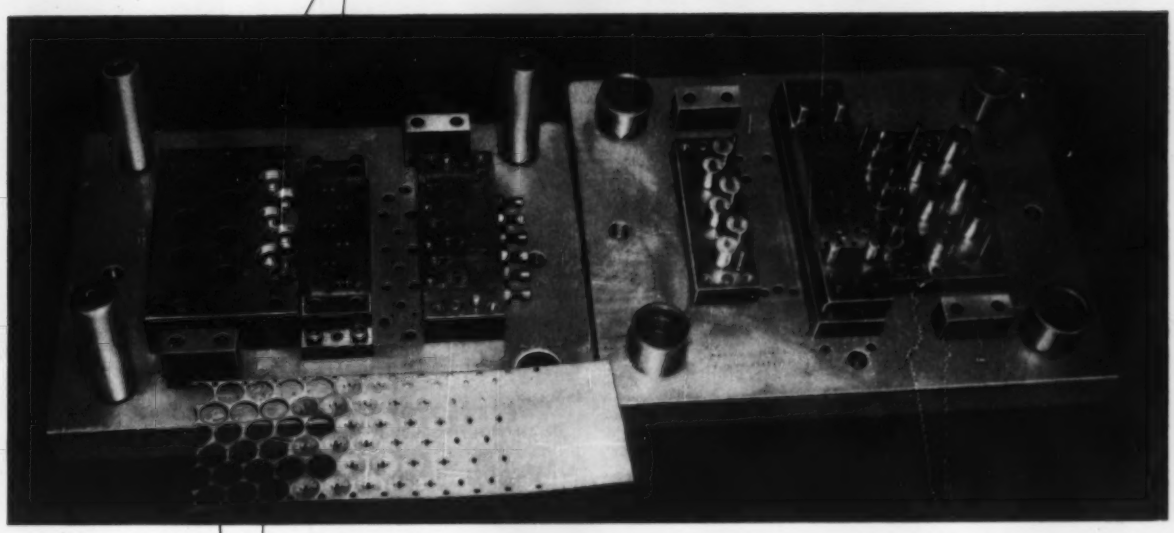


Over 150 Million Stampings from this ONTARIO Die



600,000 Film Spool Flanges PIERCED, EMBOSSED, STAMPED and BLANKED per Grind

Production engineers at an eastern camera manufacturing plant have reported excellent results from their Ludlum Ontario film-spool-flange die. The Ontario die performs the multiple operations of piercing, embossing, stamping, and blanking.

Operating at 130 strokes a minute, the big die has produced over 150,000,000 parts. Runs as high as 600,000 have been made between grinds. For this operation, Ontario is air cooled from a temperature of 1850 F, then tempered at 350 F for six hours. This results in a Rockwell C hardness of 60-62.

Ludlum Ontario is an air hardening die steel of the high carbon/high chromium type. It has all the desirable properties of such steels—resistance to abrasion, high hardness and excellent non-deforming characteristics. In addition, it is tougher but easier to machine than the higher carbon/high chromium types which are usually oil hardening.

For the finest in tool steel to help solve your cutting, forming, or blanking problems, call your nearest A-L office or distributor today, or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*

Write for your
ONTARIO BLUE SHEET

A concise 4-page booklet of facts on the handling and shop treatments of Ontario. Included is complete information on forging, annealing, tempering, etc. and detailed laboratory data on physical characteristics. *Ask for your free copy.*

Address Dept. S-682

For complete **MODERN** Tooling, call

Allegheny Ludlum

W&D 8348

AL
FINE TOOL STEELS SINCE 1854

Unique test furnace assures you of better end wall service

with Kaiser Periclase-Chrome Brick

THE refractory test furnace shown at the right was designed by Kaiser Chemicals to aid in the development of superior basic refractories for the steel industry.

One of the most important of its functions is to regularly test the effect of iron oxide and steel furnace slag on various bricks—including Kaiser Periclase-Chrome Brick.

As a result of such careful quality development and control, Kaiser Periclase-Chrome Brick are superior in your furnace—assuring less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

Leading steel producers have found that Kaiser Periclase-Chrome Brick can greatly increase end wall life or greatly reduce wall thickness, when this is preferred.

Let your Kaiser Chemicals sales engineer show you how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

For the ultimate in steel furnace refractories

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

think of Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick
- Kaiser Chrome Periclase Brick

Now available! **A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request

Wire rope lasts as long as the wire it's made of!

ROEBLING'S NEW ROPE WIRE

1105

HAS THE CAPACITY TO ENDURE...
AND

Royal Blue

WIRE ROPE
IS MADE OF 1105!

Write us for full facts on the all-steel Royal Blue Wire Rope, or contact your Roebling distributor

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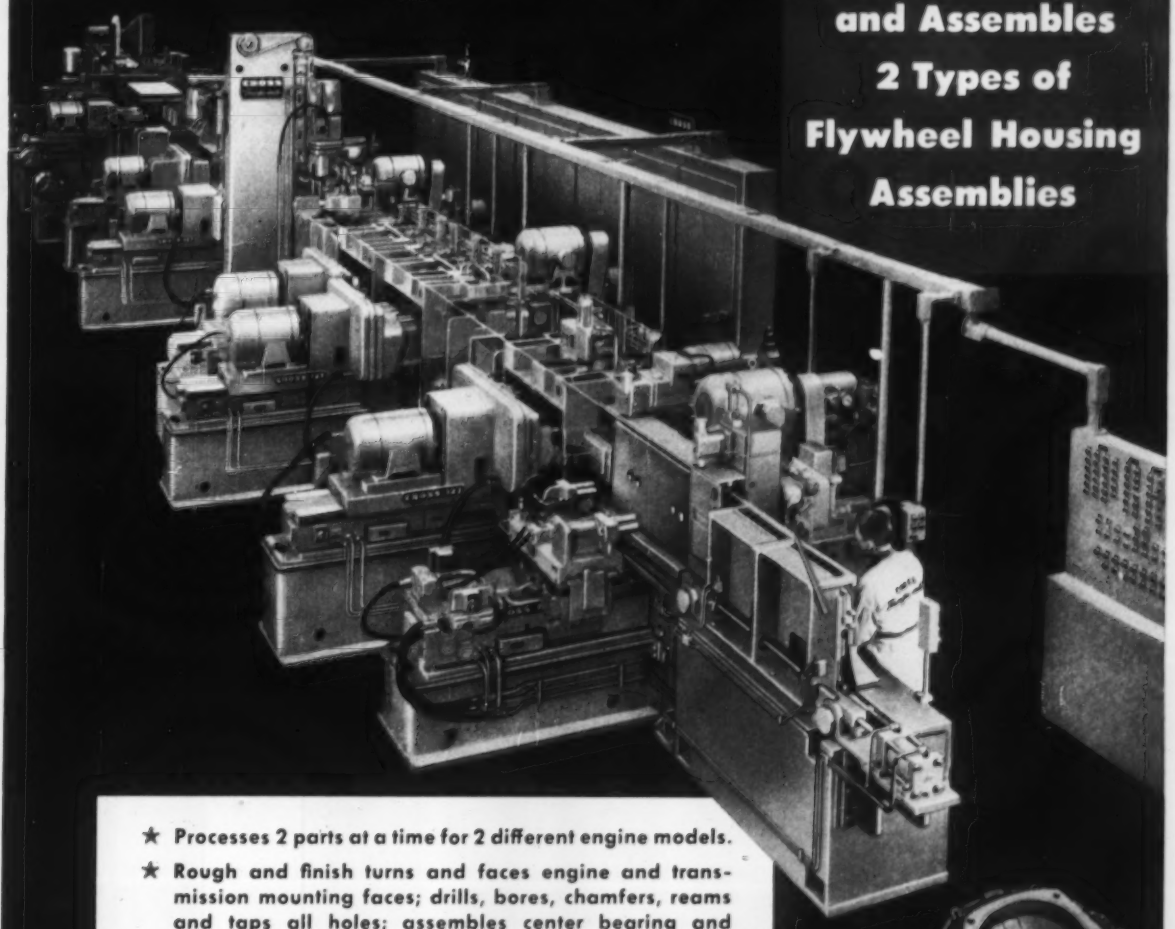
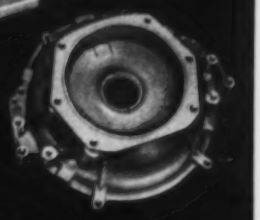
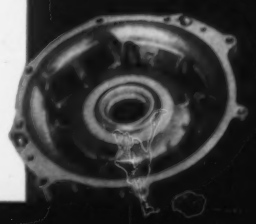
JAR CFI

Another Transfer-matic by Cross

Bores, Faces, Drills and Assembles 2 Types of Flywheel Housing Assemblies







★ Processes 2 parts at a time for 2 different engine models.

★ Rough and finish turns and faces engine and transmission mounting faces; drills, bores, chamfers, reams and taps all holes; assembles center bearing and 2 dowels; finish bores and inspects center bearing after assembly; washes, dries parts for final assembly.

★ 314 pieces per hour at 100% efficiency.

★ 20 stations: 1 loading; 10 machining; 2 assembling; 4 inspecting; 2 cleaning; 1 unloading.

★ Pre-set tools to reduce downtime for tool changing.

★ Complete interchangeability of all standard and special parts for easy maintenance.

★ Other features: Construction to J.I.C. standards; hydraulic feed and rapid traverse; hardened and ground ways; automatic lubrication.

See us in Booth No. 1118 at the Machine Tool Show

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

Operating around the clock on rugged application . . .

NEW G-E DC BRAKE REQUIRES ONLY

G-E DIRECT-CURRENT BRAKE installed on slab depiler at Jones & Laughlin. Brake has required no maintenance in first eight months of rugged duty. All settings and connections are made at one end of the brake.

GENERAL ELECTRIC

ONE ADJUSTMENT IN EIGHT MONTHS

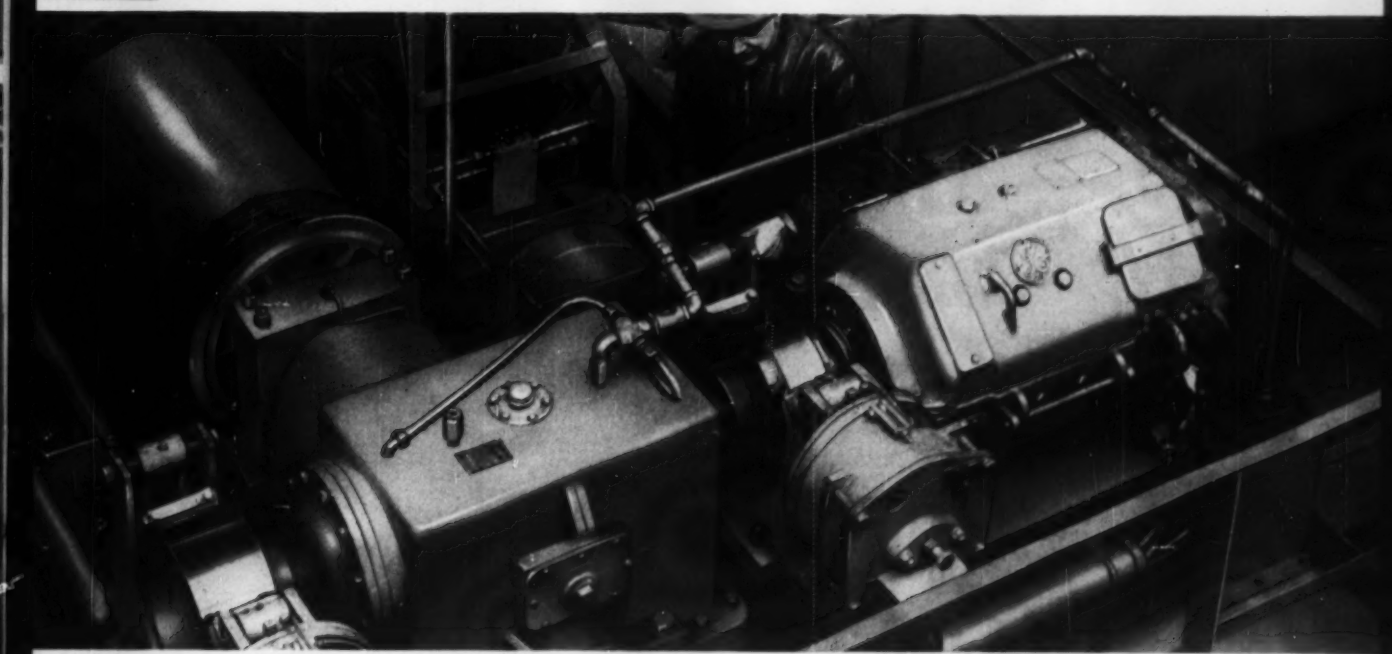
Normal compensation for lining wear at half-million operations only maintenance needed

In its first eight months of operation, a new General Electric direct-current brake has functioned with no faults and has required no maintenance or parts at Jones & Laughlin Steel Corporation, Cleveland Works Division. Only the recommended, normal adjustment for lining wear was made after half-million mark was reached. The brake is in use 24 hours a day on a slab depiling operation vital for continuous steel processing in the hot strip mill area of the plant.

Well satisfied with the brake's excellent performance, J&L specified three more General Electric DC brakes on a new 15-ton slab handling crane which recently went into service at their Cleveland Works. Rapid movement of the slabs with maximum safety for personnel are of vital importance to J&L's management and the G-E brakes are fulfilling these requirements.

The General Electric DC brake offers full-rated torque in the worn-gap position, (extra braking torque when you need it most) as well as features like single point adjustment, easily removable linings, armature-gap indicator, positive manual release, versatility of installation, and conformation to AISE Standards.

For more information about the General Electric direct-current brake contact your nearest G-E Apparatus Sales Office, or write for bulletin GEA-6214. Section 781-11, General Electric Company, Schenectady 5, New York.



SPECIFIED BECAUSE OF EXCELLENT PERFORMANCE by new G-E brake (opposite page), three G-E DC brakes were ordered by Jones & Laughlin for this 15-ton slab handling crane at the company's Cleveland Works.

Progress Is Our Most Important Product

GENERAL ELECTRIC

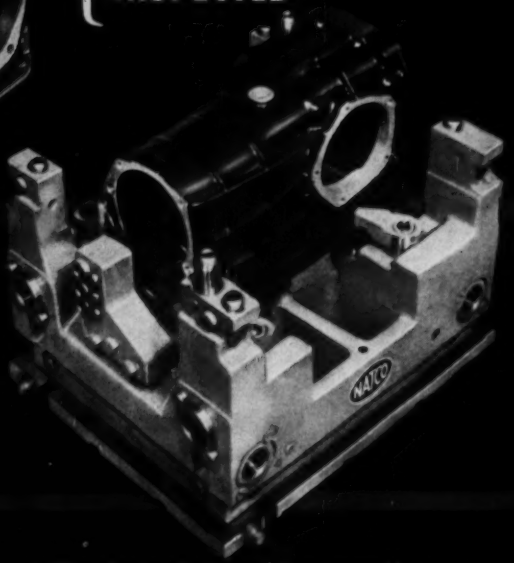
MORE TRANSMISSION CASES AT LESS COST.....

55 PARTS per HOUR

201 OPERATIONS ON EACH PART

DRILLED, BORED, REAMED, TAPPED, SPOTFACED, CROSS-FACED, MILLED, CHAMFERED and INSPECTED

Parts are loaded into individual holding units which are conveyed through the machine automatically. After machining is completed, chips are removed and the holding units pass through a washer and are returned to the first station.



for answers to your Drilling, Boring, Facing and Tapping problems

Call a Natco Field Engineer

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DETROIT, *10138 W. McNichols Rd.*
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BECOME OR REMAIN COMPETITIVE THROUGH MODERNIZATION

THE MACHINE TOOL SHOW
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INTERNATIONAL AMPHITHEATRE

... Competitize with NATCO production!

NATIONAL AUTOMATIC TOOL COMPANY, INC.

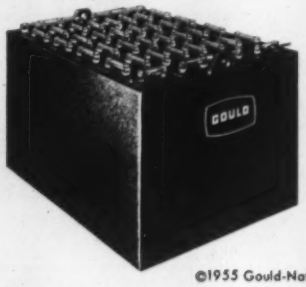
RICHMOND, INDIANA

NATCO

"Battery Performance is my Business!"

Your Gould Field Engineer has one job—to make sure you get greatest possible service from your batteries. In performing that job he sees to it that your batteries are properly cared for and maintained; he instructs your personnel in systematic maintenance methods; he helps you anticipate battery needs; he makes sure you get maximum battery performance.

Gould Field Engineering Service is nationwide. Every member is factory-trained . . . has plenty of on-the-job know-how. There's a Gould Field Engineer in your area. He's as near to you as your telephone. Call him. And when you see him, ask him for the new Gould Plus-Performance Plan material for your battery maintenance staff.



America's Finest GOULD Industrial Truck Batteries

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GOULD

Batteries

GOULD-NATIONAL BATTERIES, INC.

TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

Always Use Gould-National Automobile and Truck Batteries

UNITED

35,000 TON FORGING PRESS

A NEW 35,000 ton hydraulic forging press being built by UNITED for the USAF Heavy Press Expansion Program to help bring the United States to a commanding position in the production of modern aircraft for the armed services.

UNITED

ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

Plants at: Pittsburgh • Vandergrift • Youngstown • Canton
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Subsidiaries: Adamson United Company, Akron, Ohio
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Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

This symbol identifies the National Machine Tool Builders' Association—a group of 196 manufacturers of machine tools. 148 of these companies, or 3 out of 4, are using Garlock KLOZURE Oil Seals.

3 out of 4

Machine Tool Builders use KLOZURE* OIL SEALS

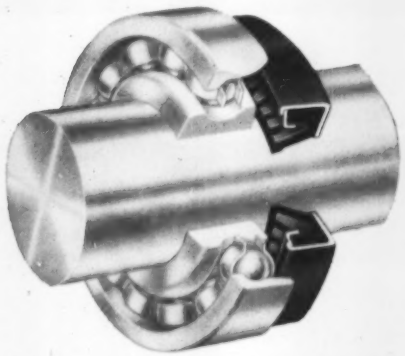
Here are 3 reasons why–

1. The KLOZURE Oil Seal is a precision-made product, so necessary for all components of the tools which are designed for fine precision machining.

2. KLOZURES are *uniform*—both in sealing contact and in spring load.

3. KLOZURE Oil Seals are extremely *efficient*—they provide effective sealing with a minimum of power loss and heat generation.

For positive bearing protection specify KLOZURE Oil Seals for your machinery. KLOZURES are made in many models and a complete range of sizes. Get all the facts—call your Garlock representative or write for KLOZURE Catalog No. 10.



Model 53 finger spring KLOZURE, for normal and high speed service, applied to a shaft to protect the ball bearing.

Model 51 — A general purpose finger spring seal for medium speeds.

Model 63 — A general purpose finger spring seal for normal and high speed service.

Model 65 — A general purpose garter spring seal for normal and high speed service.

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GARLOCK

PACKINGS, GASKETS, OIL SEALS,
MECHANICAL SEALS,
RUBBER EXPANSION JOINTS

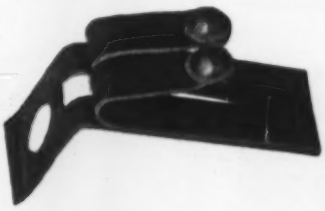
EASTERN TOOL AND STAMPING CO., Inc.

Typical example of 1-piece stamping from ⅛" thick by 7¾" diameter brass blank.

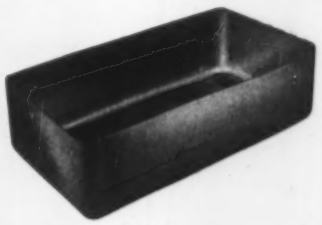
Here is a one-piece stamping that makes up into a hand stapler part.

STAMPING SPECIALISTS IN DEEP DRAWING WORK - ALL METALS - ALL INDUSTRIES

Brass Box—5" deep—14" square—17⅜" Flange.



Spring tempered phosphor bronze contact—note flat foldback feature.



Aluminum Casing — 4¾" deep — 9⅛" wide—16¾" long.

Steel Machinery Part—7¼" deep —10" dia.

Headlight—6¼" deep—7¾" O.D.

Notice the reduction in this 4⅛" long by ½" O.D. tube with 1⅛" flange.

ETS **EASTERN TOOL AND STAMPING CO., Inc.**

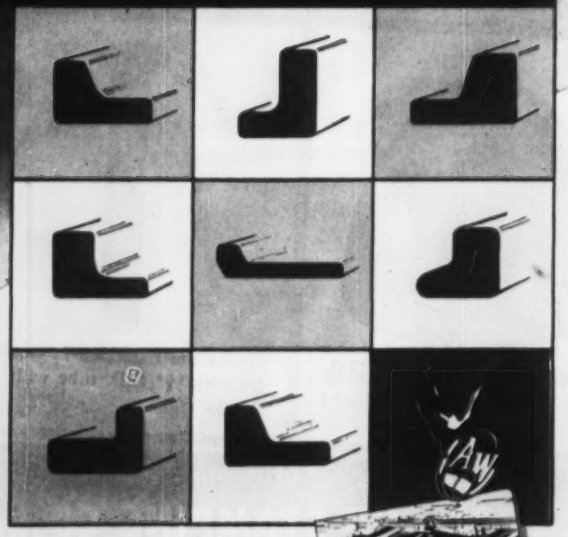
PRESSED METAL ENGINEERS
DIES AND STAMPING
110 BALLARD ST., SAUGUS, MASSACHUSETTS

Rings welded from
THIS SHAPE

instead of THIS BAR

SAVED $112,084.00
on a single order of flash-welded rings!

TYPICAL MILL-ROLLED AND EXTRUDED SHAPES
AVAILABLE FROM AMERICAN WELDING



Send for Free Catalog of Production Facilities

Find Out What American Welding Can Do For You

Substitution of a mill-rolled section for a forging previously used, cut the weight of a rough ring 114 lbs. Combined material and machining savings realized in the finished ring amounted to $200.15 per ring —a total of $112,084.00 on a single order.

Economies like this are being effected every day by roll-forming and flash butt-welding of special mill-rolled shapes. Perhaps our Industrial Products Division can help you reduce production costs on similar circular components. Write today for complete information — include blueprints — we will be glad to study your problem.

AMERICAN WELDING

THE AMERICAN WELDING & MFG. CO.
110 DIETZ ROAD • WARREN, OHIO

STEEL

August 29, 1955

Metalworking Outlook

Lukens To Diversify

Lukens Steel stockholders have approved plans for the company to diversify its products. Under investigation are earth moving equipment, plastic and sewer pipe, plastic building and decorative board, small diesel engines, special furnaces, pleasure boats and electronic equipment. A commercial development staff has been organized. More than 160 industries will be studied for growth prospects.

A Leader in the Making

Major U.S. airlines will soon determine if Douglas or Boeing will become the leading maker of commercial jet transports. Douglas will make the DC-8, Boeing the 707. United Airlines directors have been briefed on both; American Airlines will decide between the two within the next 30 days; and National Airlines already has announced that it will buy six DC-8s. Pan American Airways may purchase both planes and Trans World Airlines isn't talking, but rumors indicate that Howard Hughes, who controls TWA through the Hughes Tool Co., has been talking with both manufacturers. Eastern Airlines also is close to a decision, say industry spokesmen.

Heavy Press Interest Rekindled

Heavy forging presses, ranging from 75,000 to 100,000 tons, will receive further consideration from the Air Force this fall. Also under study is the possibility of using heavier extrusion presses. Air Force officals are hoping that a way may be found to produce certain airframe parts in large integral sections.

Foremen Need Broader Shoulders

Foremen will shoulder increased responsibility as Supplemental Unemployment Plans get under way. So says an American Management Association report. Examples: 1. The foreman will have to pay closer attention to the selection and placement of new workers. 2. Workers will have to be taught multiple skills so that they can be shifted from job to job. 3. Front-line supervisors will have to have a more realistic concept of what constitutes a fair day's work.

Potential Home Buyers Increase

Sponsored by the Federal Reserve Board, a consumer finance survey shows that the proportion of families intending to purchase a house within the next two years is higher this year than in the last three. Rate of families in the "definite" or "probable" stage has risen from 4 per cent last year to 5.8 per cent. Other facts: About 32 per cent of renters interviewed

Technical Outlook—p. 125 Market Outlook—p. 261

are dissatisfied. Some 55 per cent of all nonfarm families own their homes, compared with 49 per cent in 1948.

Conservation Regulation Issued

A new Army regulation, AR 754-10, insures Army compliance with the revised Materials Conservation Program directive issued by the Defense department. The regulation calls for more intensive conservation and substitution, if possible, in the use of critical and strategic materials. Procuring officers now may request information from contractors on their voluntary programs for saving critical materials in the design or production of miltary items.

Mannie Hits and Runs

Rep. Emanuel Celler (Dem., N.Y.) threatened to subpoena all members of the Commerce department's Business Advisory Council before his House Judiciary Antitrust subcommittee and then took off for a trip to Israel. Representative Celler says this step may be necessary to penetrate the "aura of secrecy" which surrounds BAC activities. Political observers feel that when he returns from his trip in October the incident will be forgotten. Reasons why: 1. The attack already has achieved its political purpose, making headlines in the papers across the country. 2. Averill Harriman and Charles Sawyer, two leading Democrats, are members of BAC.

Horsepower Race Gains Impetus

Automakers will soup-up face-lifting 1956 models an average of 20 hp and offer improved automatic transmissions in their drive to keep sales in high gear. Cars under 200 hp will be "underpowered;" 250 to 300 hp will be common. General Motors Corp.'s Cadillac, Olds and Pontiac will have new hydramatic transmissions, made smoother with fluid couplings. Fewer cars will offer synchromesh transmissions.

GM: Only Target for Size Study

Sen. Harley M. Kilgore's Senate Antitrust & Monopoly subcommittee has decided to limit its general study of corporate size in industry to the General Motors Corp. This means that earlier plans to include U.S. Steel Corp. have been abandoned. The subcommittee was told by Richard Heflebower, chairman of the economic division, Northwestern University, that price-fixing laws are usually a delusion.

Straws in the Wind

Good public relations: Walter C. Reuther, UAW-CIO president, announces a contribution by the automobile workers, CIO, of $100,000 for flood relief. He requests all CIO unions and their members to contribute . . . Hearings on excise tax problems are to commence Oct. 4 before a House Ways & Means subcommittee. Only technical and administrative questions will be considered; rates will not be on the agenda . . . The Commerce department is attempting to free nonclassified atomic research reports which have industrial significance.

A NEWS REPORT

...from the home of FASTEST machining steels

Leaded plates—Now lead has been added to E-Z-Cut plate. As a result, E-Z-Cut, which was already considered one of the best free-machining plates on the market, is better than ever. Tests show that New E-Z-Cut cuts even faster, polishes to a better finish than non-leaded E-Z-Cut. And because sulphur content is much lower, is much cleaner steel. First stocks include thickness up through 3".

Did you know that the largest stocks of Ledloy—world's fastest machining steel, await your call at Ryerson? Our stocks are largest from both a tonnage and size range standpoint. And stocks of other C.F. bars are also in excellent shape.

New sizes of leaded alloys—Increasing demand for New Rycut 50, fastest machining .50 carbon alloy steel has prompted Ryerson to increase the range of sizes in stock. Hot rolled rounds, both annealed and heat treated, are now available in large sizes—up through 9½". So shafting, gears, cams, etc. can be produced at savings possible only with Rycut alloys.

"Increased production 200% using new Rycut leaded alloy"—"cut unit costs 32% using Ryerson Ledloy"—"reduced machining time 35% with New E-Z-Cut plates." Hundreds of reports like these testify to the savings realized with Ryerson faster cutting steels in shops from coast to coast. And Ryerson engineers will be glad to help you apply these steels to your operations.

You can be sure of getting the latest and best of proved fast-machining steels at Ryerson because, serving the widest market with the largest, most diversified stocks, we are in close touch with every new development.

So if you want to save on the final cost of a machined part—whether carbon, alloy or stainless steel—call the home of fast-machining steels—call Ryerson.

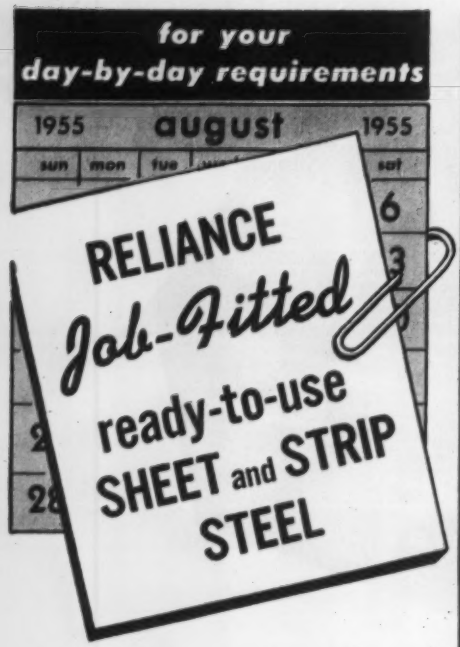
REDUCE COSTS WITH:

Rycut Leaded Alloys	**New E-Z-Cut Plates**
Free-Cutting Stainless	**Ledloy Bars**
Medium Carbon Rytense A. A.	**Case Hardening Rycase**

OTHER STEELS IN STOCK: Structurals, Tubing, Safety Plate, Sheets and Strip, Reinforcing, Tool Steels, Carbon Steel, Alloys and Stainless. Also Metal Working Machinery and Tools.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



Can we be useful to you?

RELIANCE STEEL
DIV. DETROIT STEEL CORPORATION

Processing and Distributing Plants

CLEVELAND PLANT, CLEVELAND 27, O..VUlcan 3-3600
DETROIT PLANT, DETROIT 28, MICH...WEbster 3-5866
EASTERN PLANT, HAMDEN, CONN.....STate 7-5781
MIDWEST PLANT, CHICAGO 8, ILL.....CAnal 6-2442

Reliance Customer Representative Offices

Dayton, O., Des Moines, Ia., Grand Rapids, Mich., Indianapolis, Ind., Jackson, Mich., Milwaukee, Wis., New York, N. Y., Rochester, N. Y., St. Louis, Mo., Toledo, O., Worcester, Mass.

RELIANCE
Job-Fitted
PRODUCTS

COLD ROLLED STRIP STEEL
Coils • Cut Lengths • All Tempers

SHEETS
Cold Rolled • Hot Rolled • H.R. Pickled
Galvanized • Long Terne
Standard or Production Sizes
Sheared or Slit to Actual Working Dimensions

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DETROIT STEEL REPORTS

DSC STRIP PERFORMANCE
on TOTAL shipments from Jan. 1 through May 31, 1955

99.387%

During this five month period our two strip mills at Detroit, Michigan and Hamden, Connecticut shipped millions of pounds of Cold Rolled Steel Strip and Flat Cold Rolled Carbon Spring Steel.

Taking our total shipments as 100%, here's what the performance box score means:

> for every 100,000 pounds shipped—99,387 pounds fulfilled customer expectations; rejections for all reasons averaged 613 pounds.

Because the results are stated as averages, an occasional lot of strip may have been "off" a bit more. As against that, the great majority of shipments were right-on-the-button in meeting customers' requirements.

These requirements represented just about every specification in the book, including split-hair thickness tolerances, special tempers, etc. The variety of jobs ran the gamut of stamped and roll-formed products from comparatively simple ones to some of the toughest.

Why not talk over some of your own strip requirements with a DSC Customer Representative? We'll welcome the chance to work with you . . . and that goes for any of our products.

Customer Satisfaction Is Our No. 1 Job

DETROIT STEEL CORPORATION
GENERAL SALES OFFICE—DETROIT 9, MICHIGAN

DSC CUSTOMER REPRESENTATIVE OFFICES
Chicago, Cincinnati, Columbus, O., Dayton, O., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, Richmond, Va., St. Louis, Toledo, Worcester, Mass.

DSC MILL PRODUCTS
Hot Rolled and Cold Rolled Sheets
Cold Rolled Carbon Steel Strip — Flat Cold Rolled Carbon Spring Steel
Low and Medium Carbon Manufacturers' Wire — High Carbon Specialty Wire
Aluminum Cable Strand Reinforcement — Rope Wire — Tire Bead Wire
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Machining Revolution

The last decade has witnessed a great revolution and expansion in the processing of metals. It's just the beginning.

There's ample evidence of what lies ahead in the observations of machine tool builders and users in this issue of STEEL (page 129). There will be further evidence at the show in Chicago next week.

During the war, equipment makers and plant engineers came up with many ideas. But winning the war couldn't wait for designers to dream up new models and get them into production. The job had to be done with available types.

Since the war, engineers have had more time to work on new and improved machine tools and presses. They've been aided by vast and startling developments in electrical, electronic, hydraulic, mechanical and air controls and devices. Automaticity has spread from the Gargantuas for machining auto engine blocks to shorter lines and single machines for processing less cumbersome work at breath-taking speeds.

Now the pressure is on for machines and production lines that will get out still more work in less time at even lower costs.

People want bigger incomes for fewer hours worked and still higher standards of living. As a consequence, a labor shortage is developing in the face of a sharply increasing population and the greater demand for consumer goods.

As production goes up, technical men have the problem of supplying more equipment for machining and forming ever-growing quantities of metals and alloys.

Steel capacity can be expected to increase an average of 4 million tons a year to 185 million tons in 15 years.

Aluminum capacity of 1.5 million tons probably will be a third higher in the next five years. The Canadians also figure on marketing a large tonnage in this country.

Larger quantities of copper and zinc alloys will be needed in an expanding economy. Not to be overlooked is that dark horse, titanium, which will find a niche somewhere between steel and aluminum.

It means that $1.3 billion worth of machine tools a year—double present volume—will be required to care for obsolescence and expanding capacity.

Management cannot overlook what's happening if it wants to remain competitive in this changing economy.

Irwin H. Such

EDITOR

IT'S COST PER CUT THAT COUNTS!

What is the cost of band sawing?
What is the cost of hack sawing?

Let's Find Out in Truth

Many people are currently confused by conflicting claims and so-called "production records" of band saw machine builders and hack saw machine builders; and it is timely that the "air be cleared."

As the ONLY American manufacturer who has uninterruptedly built and sold BOTH metal-cutting band saw machines and hack sawing machines for more than 37 years, we have decided to boldly "clear the air."

In our Booth No. 416 at the Machine Tool Show, Chicago, September 6th to the 17th, an internationally known firm of test engineers will publicly conduct an unbiased fact-finding test. Under their complete control, a band sawing machine employing high speed steel bands, and a hack sawing machine employing high speed steel hack saw blades will be run continuously on identical work under fixed and rigidly maintained conditions. The result of their unbiased findings, after the conclusion of the test, will be published and distributed to all persons who make request at the Show.

Both the hack saw and band saw machines to be run in this test will be new MARVEL models, undergoing their first showing, unquestionably capable of running the blade at the highest speed and the heaviest feed that any saw blade will withstand with reasonable and practical blade life on the test bar selected. The test engineering firm will select the blades to be used from available stock of various brands.

Every precaution will be taken to conduct the test on a strictly unbiased basis. WE DO NOT CARE which way this public test may turn the tide, for we, alone, build BOTH TYPES of machines – band saws and hack saws. We therefore boldly sponsor this test, seeking TRUTH.

Be sure to see it—BOOTH NO. 416—The Machine Tool Show.

Of course, our full line of MARVEL SAWS will also be demonstrated in operation, to the extent that the limited space allowed us will permit. Other machines, not possible to exhibit in our crowded booth will be available for demonstration at our Chicago plant.

MARVEL Metal Cutting SAWS
Better Machines–Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

Consumer durables grow soft at retail level, with liberal discounts to buyers, but . . .

Manufacturers Expect Continuing Boom

DEALERS armed with intensive advertising that offers discounts, trade-in allowances, etc., (like above) are almost coercing John Q. Public into buying consumer durables—a new refrigerator, deep freeze, TV-set, radio, dishwasher, washing machine, dryer, disposal, air conditioner, range or automobile.

Industry Facts—While soft spots are appearing at the dealer level, manufacturers are elated over first half returns and the sales prospects for the remainder of this year—and into 1956.

The Radio-Electronics-Television Manufacturers Association reports: "Shipments to dealers during the January-June period amounted to 3.1 million TV-sets, compared with 2.7 million units shipped during the same period in 1954. There is no inventory problem at any level. If anything, stocks are a little low." Factory shipments of radios, says RETMA, will be about the same as last year, reaching the 10 to 11 million mark for the year.

The American Iron & Steel Institute's market classification section reveals (under these headings: appliances, utensils, cutlery and automotive) that steel tonnage to consumer durable goods producers has increased from 6.8 million tons for the first six months of 1954 to 10.7 million tons for the first half of this year. Comparably high shipments are continuing through the third quarter.

Company Statistics — Westinghouse Electric Corp.'s appliance division finished the first half with sales to distributors running 25 per cent ahead of the first six months of last year. Best sellers during this record period were automatic clothes washers and dryers, freezers, ranges and dishwashers. John H. Ashbaugh, vice president and general manager of the appliance division, is confident that this is only the beginning. "We anticipate even greater sales during the remainder of this year at not only the manufacturing level but also at the distributor and retail levels."

"Grinning quietly" as they study returns, the General Electric Co.'s appliance division indicates that sales are near record levels and will continue to be through this year. Says one official: "It is certainly a 'bullish' year so far."

Cool Sales—A. W. Bernsohn, managing director, National Appliance & Radio-TV Association, reports that a "hot summer" has wiped out a stock of some 1.8 million room air conditioning units and that peak sales are the order of the day for 1955 models. Television is enjoying increased summer sales, too, says the association.

Auto Rundown—*Ward's Automotive Reports* recorded a general inventory build-up of new cars from 707,000 on July 31 to 730,000 on Aug. 10. But, says Ward's

"this is not unusual during a month's opening ten-day period. In fact, the industry's major producers are gearing factory output so tightly to sales that any sizable inventory reduction is ruled out until September and October."

However, stocks have increased by 57,000 since July 10, and there are indications that dealers may be hit hard. Average dealer operating profits before taxes have dropped from about 6.3 per cent on sales in 1950 to about 0.6 per cent in 1954. Current ratios are slightly better than last year's.

During the closing months of the year, Ford, Chrysler and General Motors will attempt to equal or exceed their peak production months of 1954 (see page 117).

Prices—On Aug. 1, Hotpoint Co. increased retail prices on five of its nine major appliances about 3 per cent. Westinghouse's Ashbaugh explains: "When our present supplies of steel, copper and aluminum have been depleted and it becomes necessary to re-stock at a higher cost, it will be necessary to raise prices of appliances."

Fact to remember: Keen competition will keep all price hikes in the consumer durable goods field as low as possible. Some producers, including automakers, may attempt to absorb at least part of the increased cost of materials in an attempt to gain a more competitive sales position.

Stocks are high; some dealers are becoming a bit panicky; but look for consumer durable goods producers to establish records in the third and fourth quarter as they head for a banner 1956.

Defense Contracts Dispersed

Fifty-eight of the 185 defense contracts issued by the Defense department since April, went to new contractors.

A department bulletin asserts that the 58 awards come to $99 million of a $1.2-billion total.

Part of a new policy in maintaining defense mobilization, the contracts are aimed at smaller businesses spread over a wide area.

Objectives: More subcontracting, geographic dispersal and less concentration of contracts among a few leading producers.

Metalworking Digs Out

The floods have left a mammoth clean-up job for industry. Brass is hardest hit; some steel mills lost production. Rebuilding pressures will accent structural steel pinch

STEEL producers lost no time in regearing to help the Northeast shake off flood damage last week.

Clifford F. Hood, president, United States Steel Co., pledged full scale assistance. "Steel required for essential repair and reconstruction in the six storm-affected areas," he said, "will be given emergency priorities in mill production schedules." That's a tall order: The company's mills are operating at near capacity and order books are filled 60 days ahead.

Overtime — American Steel & Wire Division's mills in the Chicago, Cleveland and Pittsburgh areas swung into overtime to produce things like nails, wire guying strand, utility poles, guard rails for highways and bridges, telephone wire and electric cables, fence and barbed wire.

Bethlehem Steel Co. reported: "Production schedules will be interrupted to give first preference to steel needed to restore normal life and activities in disaster areas." Emergency shipments already were under way from some Bethlehem plants by last Tuesday; others have been shipped since.

Hard-Hit — Steel companies didn't come through undamaged. Though the Fairless Works was able to maintain production, U. S. Steel's Wire Division was shut down at the Blackstone river plant. Damage was estimated at $2 million; 4000 workers were idled. Repair crews had to use rowboats to get into the plant. Some electric motors may take as long as three weeks to rewind. Loss of production is figured at about ten days. Though some workers were back on the job within three days, others may be out for another two weeks.

Bethlehem Steel Co. was hit hard. It may lose about ten days of production at its Bethlehem, Pa., plant, the nation's largest producer of structural shapes. Officials reported that as soon as it could be put back in operation, output would be available to assist reconstruction in the flood area.

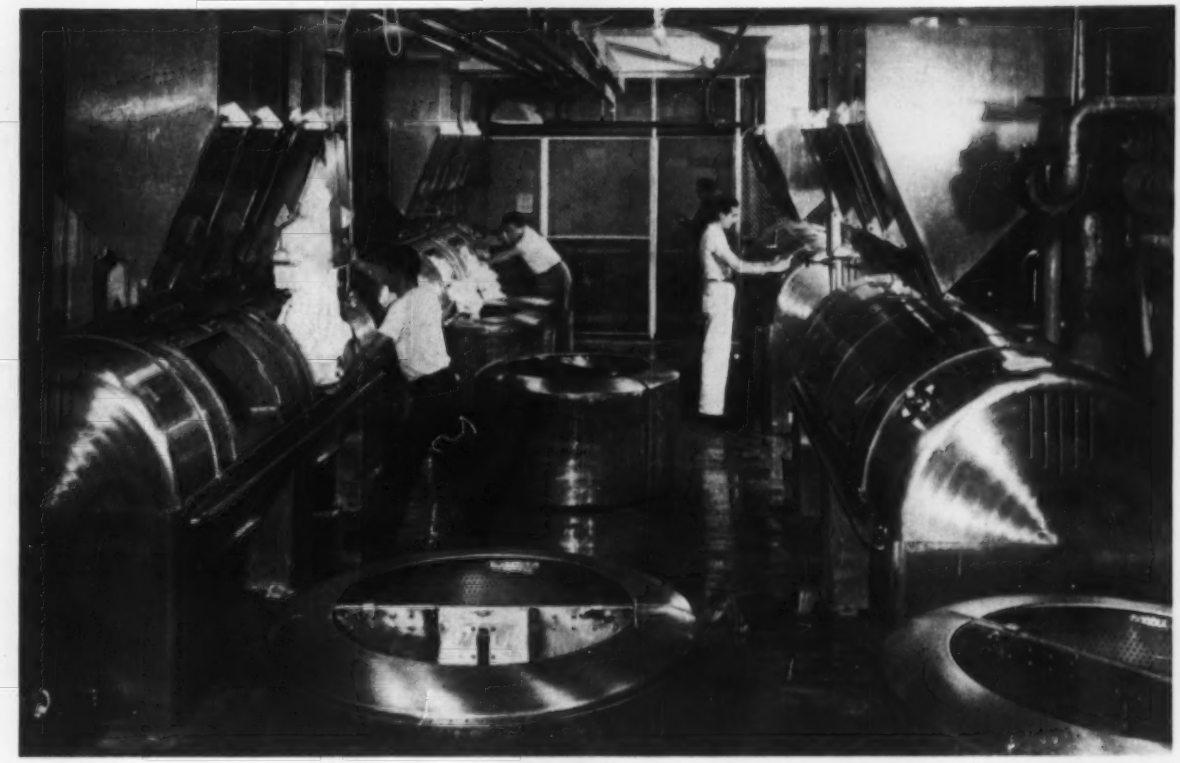
More—Among metalworking industries, brass producers suffered the heaviest damage. About one-third of the nation's capacity is digging out of flood sludge in Connecticut. Chase Brass Co., American Brass Co. and Seymour Mfg. Co. were among the hardest hit. A spokesman for Chase's Waterbury mill said that "hardly a single piece of equipment escaped damage." For a full analysis of this picture, see page 264.

Other metalworking companies, though themselves unaffected, lost production when power failed. The Torrington Co., Torrington, Conn., had three plants shut down.

Side Effects—More output will be lost because of disrupted communications. Telephone companies were faced with a nightmare rewiring job. New England Telephone & Telegraph Co., with some 56,000 circuits out of action, was typical. Railroad service disruptions will take even heavier toll.

Aid is coming in from many organizations. Take the Massachusetts operation of the Small Business Administration. Work is being done with the state Chamber of Commerce to arrange for disaster loans, and the usual restrictions on company sizes are relaxed. Associated Industries of Massachusetts is arranging for government contractors to sublet contracts to firms with available machinery. Offers are pouring in from out of state to help those companies faced with the necessity of complete relocation.

Aftermath—It's too early to estimate total damage in facilities and loss of production. The rush for steel is only beginning as debris is cleared out and the sludge dug away. But reconstruction on this large scale means that there will be no let up in the demand for structural steel products, already squeezed by the building boom.



American Machine & Metals Inc.

Manufacturers turn from black iron to stainless steel

Laundries, Dry Cleaners Automate

ONE WAY you can safely criticize your wife is to tell her to send your shirts out because the laundry does a better job.

Thanks to laundry and dry cleaning equipment makers, you'll be right 99 per cent of the time. For the wife in a 100 who'll feel slighted, wrap up your case by explaining that the laundry will iron each shirt in 2 minutes, compared with her 20.

Why?—More automation in laundry and dry cleaning equipment accounts for the time savings. It's also a factor in boosting sales of this $80-$90 million industry. Sales last year, says the Laundry & Dry Cleaning Association, New York, were estimated between $75 and $80 million. Equipment makers feel this year's total may go up another $5 million.

The trend toward more automatic equipment is giving the electrical component producers a bigger share of the supplier business. In size and cost, some of the equipment is comparable to many machine tools. An automatic washer, for example, may weigh up to 5 tons and cost $10,000. An ironer may weigh 15 tons.

Iron to Stainless—In both dry cleaning and laundry equipment, developments in synthetic washing compounds have been a factor in the swing from black iron to stainless steel construction.

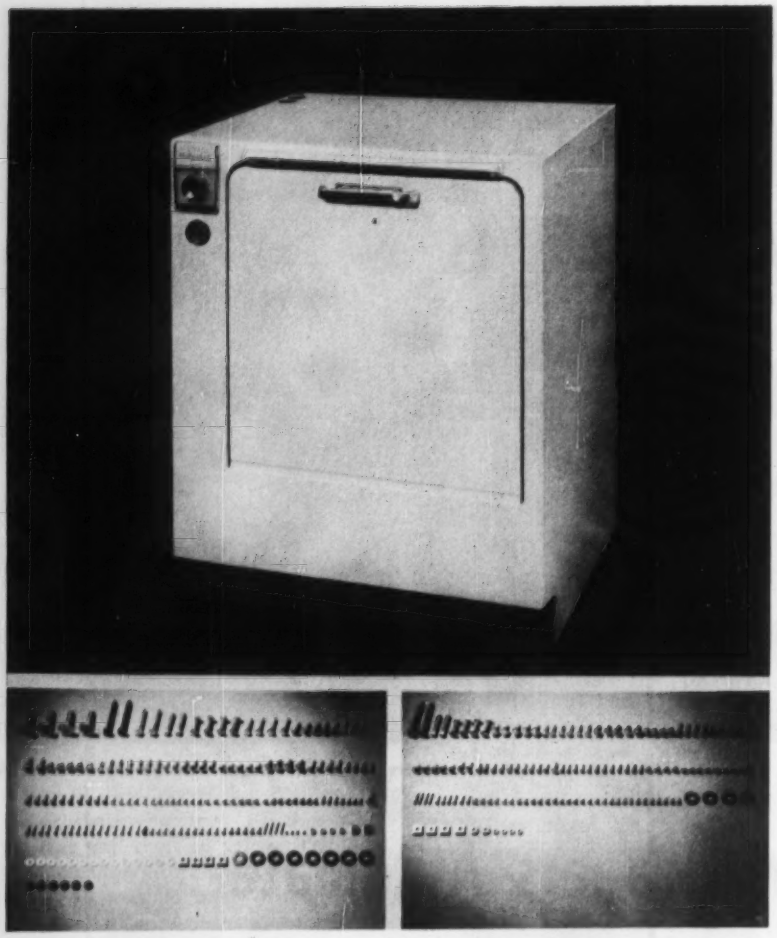
The perennial worry of the industry is that home washing machines —now becoming more automatic and getting companion dryers—will cut down on the commercial laundry business. But commercial laundries and dry cleaners (estimated at 50,000) are still thriving for the most part—even though the Chinese laundryman, who wasn't a customer in the first place, is losing out.

New Approach — Postwar launderettes, to which the housewife could take her washing and do the work on rented domestic-type automatic washers, had temporary impact. They have been taken to the cleaners by shops where the housewife drops off the laundry on her way to shop, picks it up, washed and ironed, on her return.

Companies like Troy Laundry Div., American Machine & Metals Corp., East Moline, Ill., were quick to see opportunities here. Troy developed its "Laundrite" line of equipment which is bigger than domestic washer but smaller than commercial.

Large commercial laundries and dry cleaners are opening two kinds of branches; housewives "drop off and pick up" or the company "picks up and delivers." This and the starting of many small businesses is one reason why there has been a trend away from custom-built equipment. Most larger companies have production line models which are sold through jobbers.

However—Commercial laundries, hotels, hospitals and universities still provide a substantial market for the heavy equipment.



Investigation of this Hotpoint Co. appliance reduced fastener types from 62 to 46, decreased the number of fasteners required from 189 to 135

It Pays To Standardize

IF YOU ARE developing a standardization program, start with fasteners. Savings can run up to 10 per cent.

Case Study—In working with a large appliance maker, Pheoll Mfg. Co.'s engineers analyzed the use of over 2000 fasteners. On one product, the customer was specifying five slight variations of a common fastener. Without handicapping design engineers or the product, three variations were eliminated.

The 2000 types and sizes were reduced to 1300. Estimated savings: 11 per cent on an annual fastener bill of $100,000.

Campaigning—Pheoll wants to standardize fasteners among its customers and throughout the industry. "Savings," say company officials, "go beyond the price of the fasteners."

1. Purchasing—with the same total, but fewer types, larger orders of each type mean quantity discounts. Overhead is reduced; fewer orders mean less paper work.

2. Inventory—fewer types and sizes save on storage requirements, mean fewer control records and reduced clerical detail, less time in checking and inspecting stock.

3. Production—more general-purpose fasteners increase interchangeability and flexibility. Assembly is simpler, faster. There is less chance of a production tie-up due to fastener shortages on the line.

4. Others—gains come in expediting, inspection and field service because of fewer types, less paper work.

The Program—To start, Pheoll engineers recommend: Classify your stock of fasteners by type and size. Don't do it by departments; expensive variety often stems from independent department operations.

Seeing all the fastener types and sizes together will suggest standardization possibilities: Why can't that round head fastener be substituted for the hex head? Here are two applications using the same fastener that differ ⅛-in. in length; won't the same length do for both?

You may find ways to combine applications and cut down the number of fasteners needed.

Special Fasteners — For some jobs they are the only solution. But each time a special fastener is called for, ask: 1. Are its advantages worth the extra cost and time? 2. Is it really essential or will a standard type, with its lower cost and quicker delivery, do the job?

Report Shows Sales Shift

Distributors in smaller communities are making more industrial sales as manufacturers continue to move away from the city.

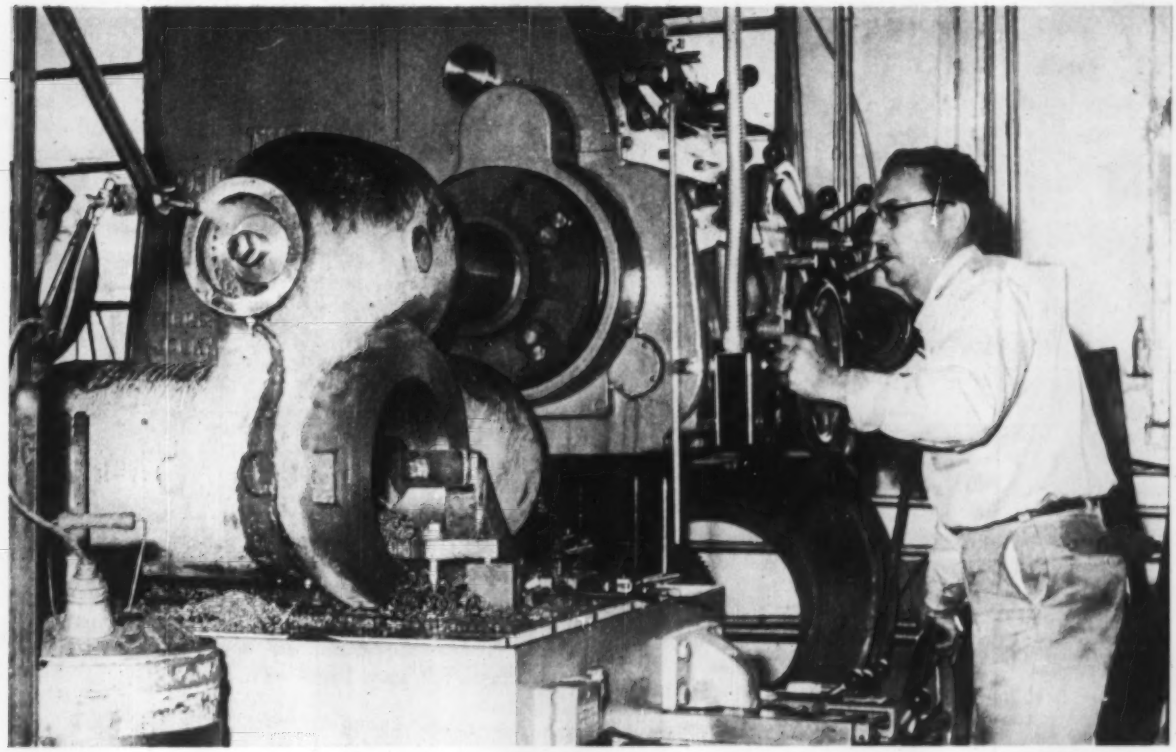
Their share of sales has climbed from 15.1 per cent in 1940 to 24.2 per cent in 1954. This information comes from a new analysis of industrial supply distribution by the American Supply & Machinery Manufacturers' Association.

Among the major cities, Los Angeles holds first place in the industrial sales race. Chicago, New York, Detroit and Cleveland follow.

Statewise, New York claims 10.4 per cent of national sales; California, 10 per cent; Ohio, 8.6 per cent; and Pennsylvania, 7.7 per cent.

The report puts almost 50 per cent of these sales in the Northeastern Central and Mid-Atlantic States.

Included in the report are sales percentages for six major product groups and the average number of distributors per manufacturer in each city.



A mud end for a slush pump is milled by Wilson Mfg. Co. Inc.

Oil Well Equipment Sales Flow Evenly

"THAR' SHE BLOWS" will be shouted a record number of times as some 56,000 new wells are drilled in the U. S. this year. So predicts the American Association of Oilwell Drilling Contractors (AAODC). In 1954, about 52,000 were "brought in."

Will this mean a large increase for oil well drilling equipment manufacturers? Wilson Mfg. Co. Inc., declares: "Our equipment sales have risen 20 per cent." On the other hand, Emsco Mfg. Co. reports: "Equipment sales did not rise appreciably in the first half of 1955 over 1954."

Sales Picture—While there are indications that sales will be as good or a little better than any of the industry's best years, there is a paradox. "More wells are being drilled," says Wheland Co., "but fewer rigs are being used because of the increased portability of equipment."

Manufacturers are in a race to see which one can turn out the best and fastest equipment. Examples of success: 1. In the Oil City, La., area, on 1600-ft chalk wells, the drilling time has been reduced from 28 to 18 hours in the last two years. 2. While in Grayson county, Tex., contractors have cut 10 to 15 days from the drilling time needed for a 10,000 to 11,000-ft well.

New Markets—Brad Mills, executive vice president, AAODC, advises that offshore activity is having a stimulating effect on equipment sales. He points out: "One large barge outfit represents a greater expenditure than two or three land rigs." Cameron Iron Works Inc., states that offshore activity is helping their sales picture, while Wilson is even more optimistic, predicting: "We estimate that a large per cent of our market in the next few years will be with the Louisiana - Texas coast." Another bright spot for oil well equipment makers is the development of foreign markets, especially in South America.

Statistics—Rigs can cost from $20,000 to $500,000. Average cost of a medium rig, one which will drill to 8000 ft, is about $190,000.

Mobility is the new byword for equipment which drills shallow or medium wells. Portable drills reduce the time required to tear down and set up a rig. There is one big drawback—mobile units are extremely difficult to move over highways in some states.

Other Trends—Because production depths are gradually increasing, a move is being made toward heavier equipment. Rig components such as drawworks, pumps, etc., are being combined into units suitable for truck movement. There also is a growing demand for controls which will take higher pressures.

"Each producer," says Emsco, "is making an effort to produce a drilling rig which will not only drill faster but move faster."

Five Ways To Whip Costs Into Line

1. Organization and Discipline:	**Action should be inspired by management**
2. Management Training:	**Foremen and department heads spend most of the production dollar. Make them see their responsibility**
3. Management Follow-Through:	**It's easier to develop standards than to meet them. Written progress reports are a must**
4. Manpower Control:	**The bill for labor must be kept close to the ideal for any level of production**
5. Accounting Analysis:	**Put accountants on management team. Have them show reasons for any departure from standard costs**

How To Get More Out of Budgets

By M. K. SHEPPARD
M. K. Sheppard & Co., Cleveland

MANUFACTURING expenses slashed $57,757 a month, direct labor costs cut $11,438 a month. Saving: Better than $818,000 a year.

That's how a budget system pays off for one auto supplier with a labor force that hovers between 1200 and 1400. Any company, big or small, can do the same if: 1. It tailors any recognized system of budget control to its needs. 2. It follows through on administration.

The spark needed for success calls for leadership.

Case History — Shortly after World War II, a famous general became president of a sprawling, 60-plant organization. To knit it more closely together, he used a simple but effective management formula: Organize, delegate, control.

The general inherited a command with four geographical divisions. Each division had a sales and a manufacturing head. Clashes between the two wound up on the general's desk. He centralized responsibility by putting a vice president in charge of each division. Over them, he installed an executive vice president reporting directly to him. In the smaller divisions, he handed down more authority to top men than ever before.

Action — Each month, operational vice presidents gather in his New York office. A control group of engineers and accountants compile charts and figures for each plant, division, and the company as a whole. An unsatisfactory plant is red flagged. It must be out of the red for three months before it is dropped from the unsatisfactory list. Every man in authority works with that plant to get its problems corrected.

The plan has made progressive cuts in manufacturing expenses. After five years, savings were running at $9 million annually. Point: Organization and discipline come first. This province belongs to the top brass.

Management Training—Foremen and department heads are responsible for spending most of the money that goes into production. If costs are high, it is probably because these men have spent more for labor, material and departmental expense than their produc-

tion justified. Every budget program requires that the reasons for cost cutting be thoroughly understood by these men. They should have an equally sound knowledge of the mechanics of the budget's use and operation.

At supervisory meetings, budget reports are the basis for the solution of such problems as excess personnel; too much overtime; high supply costs; loss of production while waiting for materials, tools, machine repair, instruction or manpower.

Follow-Through — It's easier to develop budget standards than to see that they are met. Key men should be informed of every inefficient operation in writing. Departments should make a written report on the reasons for failure to achieve standard performance. The report should pinpoint the factors that cause loss and show management how to eliminate them. A department's responsibility, however, isn't over until it has worked with management to get things straightened out.

Manpower Control — For successful budget operation, labor costs must be kept in close proportion to the work load. Three types of systems give excellent results:

1. Manpower budgets based on labor standards for direct labor and on fixed and variable budgets for indirect labor for all departments.

2. Manpower tables listing every position on the payroll. They should show proper manpower for the volume of the current quarter and two or three in advance. The projection is made to estimate what manpower will be needed to take care of expected volume. Planned manpower reductions can then be made to take advantage of improved operating practices.

3. Instead of expressing labor variances in man-hours or dollars, use arithmetic to convert them back to equivalent people: "You had 50 too many men on your payroll last month," rather than "labor variance for period ended July 31 was 8000 man-hours."

Applying the second system, a rubber plant reduced its payroll from 1700 to 1200 in one year. It was able to maintain full production volume of 10,000 tires a day.

A steel mill had to reduce its operating rate from 75 per cent to 50 per cent of capacity over a four-month period. It dropped its original payroll of $3 million to $2 million a month. Using the third system to make an easily recognized concept for the department heads, the budget administrator was able to cut labor variance from $300,000 to $35,000 a month. Labor variance usually soars when production has to be cut back.

Accounting Analysis — Every budget system should be an integral part of the accounting records. The modern business accountant doesn't wear a green eyeshade or perch on a tall stool. He must assume the responsibility of using accounting records to assist other company offices by checking their policies and activities. He looks on records as business controls rather than as figures in ledgers. He has the responsibility of carrying out management's budget objectives. Often he must sell or stimulate others to action by attention-getting cost information.

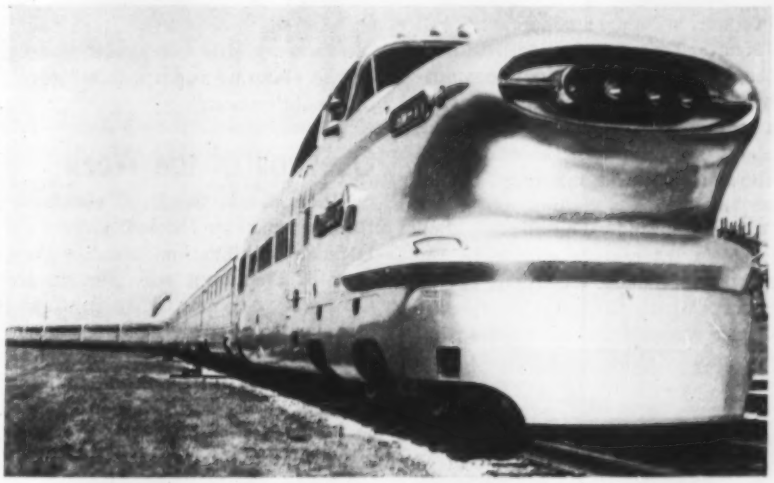
To make budget control fully effective, accounting must be on the alert for any departure from standard costs, using the principle of "management by exception." It should make these duties and services routine:

1. Analyze accounting records to reveal poor operating practices. Help management by interpreting company policies.

2. Compare one future course of action against another.

3. Reach conclusions in terms of effect on profit.

Sink or Swim—The best budget system can fail miserably if a foreman doesn't think it's necessary. It can fall just as flat if the president isn't sold. And if all members of the management team don't co-operate to the full, the budget administrator probably will be like a swimmer against the tide, struggling valiantly just to stay in one place. The key to continued budget success is follow-through.



GM Christens New Train

A BOTTLE of champagne broken on the nose of the 1200-hp locomotive introduced *Aerotrain*. The 10-coach, 400-passenger train is General Motor's answer to the passenger train deficit.

N. C. Dezendorf, GM vice president and general manager of the Electro-Motive division, said the train is designed to cut weight over 50 per cent; investment, maintenance and operating expenses nearly 60 per cent.

Features: An air-ride suspension and four-wheeled cars; replaceable aluminum bodies mounted on steel underframes; a low center of gravity combined with a high ride; top speed, 102 mph. Estimated cost is $1000 a seat.

By E. C. KREUTZBERG *Washington Editor*

Industry expansion and mobilization scrutinized as . . .

Senate Reports On DPA

CAPITOL HILL is showing a sharper interest in defense mobilization. Reporting on the Defense Production act amendments bill (Senate Report No. 696), the Senate Banking & Currency committee explains: "It is expected that a change in emphasis will bring about more intensive efforts to eliminate the remaining bottlenecks . . ."

Policymaking—The Senate committee's interest is shown in the re-written policy statement of the report which states: "A specific Congressional finding shows that the mobilization program requires the development of preparedness programs and the expansion of productive capacity and supply beyond the level needed to meet the civilian demand, to make possible speedy conversion to full mobilization in the event of an attack on the United States."

While the Office of Defense Mobilization is closing down most expansion goals (see STEEL, p. 42, Aug. 22), it is anticipated that this new Senate interest may revive several dormant programs which include expansion in heavy boilers, gear and turbines, heavy steel castings and forgings and a new elephant tool program.

No Confusion — Report 696 points out that this is not a fundamental change in the policy of the Defense Production act, but "an increase in the emphasis placed on the planning for possible future full mobilization."

Question of the Week

When should the U. S. purchase foreign machine tools? Office of Defense Mobilization Director Arthur S. Flemming will appoint an interagency committee to find out. Domestic makers, resenting recent Air Force purchases of 40 radial drills from a British firm and 20 shapers from an Italian producer, contend that Executive Order 10582 virtually orders government agencies to buy foreign goods when prices are at least 6 per cent below the lowest domestic bid. Machine tool builders feel that the portion of the executive order authorizing an agency to reject any bid in the national interest is too weak. They recommend: Establish a new criterion to prevent the placing of machine tool orders abroad which may tend to reduce a domestic builder's potential ability to meet future defense demands.

Defense Producers Listed

Some 23,000 "first-team" manufacturers, which have detailed mobilization production schedules for military items, are listed in the revised Register of Planned Mobilization Producers. T. P. Pike, assistant secretary supply and logistics, Defense department, emphasizes that the main reason for setting up the list is to focus attention on survival-type weapons and other first priority items. This is one of the initial steps toward getting military orders prepared so that they can be triggered automatically in case of attack.

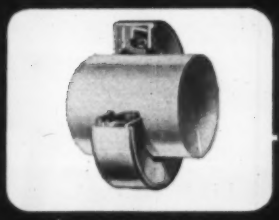
GSA: Foundry for Sale

Plans to lease the government-owned foundry and machine shop at New Castle, Pa., have been called off by the General Services Administration. The agency will make another attempt to sell the property. Built during World War II at an acquisition cost of about $23 million, the plant failed to attract a buyer when offered for $14.5 million. The change in thinking came after Edmund F. Mansure, GSA administrator, conferred at New Castle with Norman E. Clark, president of the Greater New Castle Development Association. Observers' opinion: GSA has been assured that buyers are available.

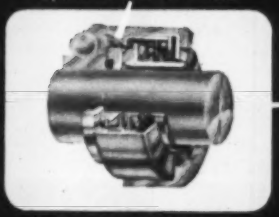
Machine Tool Shortage?

At the request of Sen. Edward J. Thye (Rep., Minn.), the staff of the Senate Small Business committee is making a study of the machine tool industry. Purpose: To discover if small companies can still obtain sufficient machine tools for civilian production lines. In hearings of February, March and April of 1952, the Subcommittee on Relations of Business with Government, headed by Senator Thye, was told that demand for many machine tools with defense priorities was so heavy that small business was having difficulty getting such tools for commercial needs. If staff findings warrant, hearings will be scheduled for December or January.

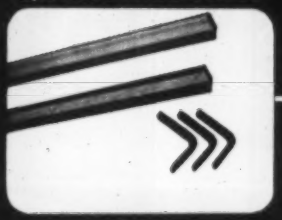
FOR PERFORMANCE PROTECTION



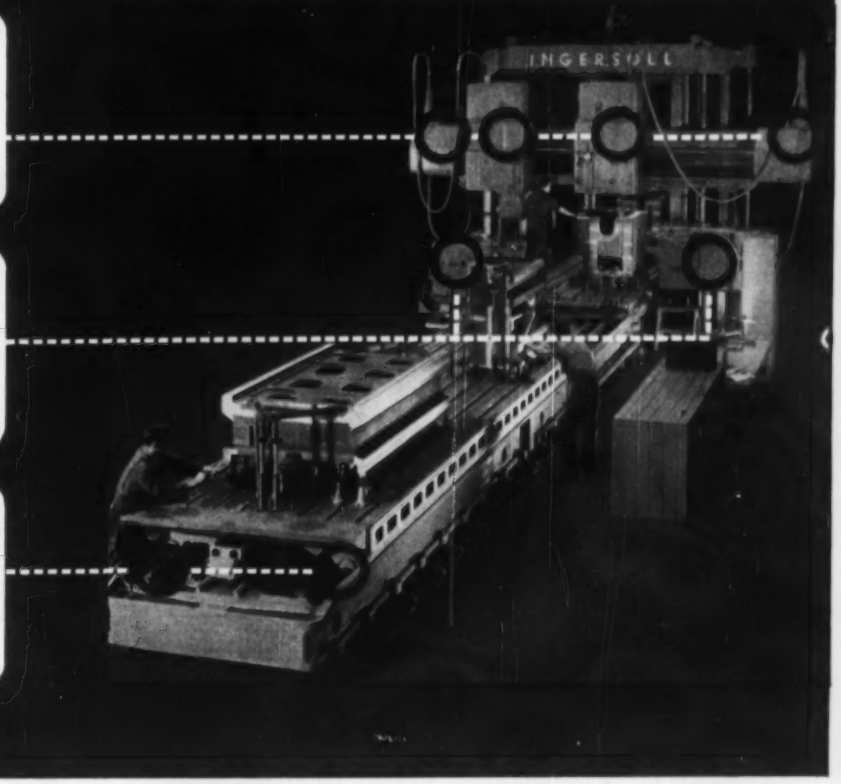
C/R SHAFT SEALS



C/R END FACE SEALS



C/R SIRVENE WAY WIPERS



Which seal is the best answer to your problem? C/R Engineers know. They've helped machine tool builders solve tough-sealing problems—successfully—for years.

C/R SHAFT SEALS deliver outstanding sealing performance and service life on medium speed shafts, gear cases and drive mechanisms. They seal lubricants, exclude chips, coolants, abrasives—and require minimum radial and axial space.

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C/R SIRVENE WAY WIPERS give maximum protection to sliding assemblies under long and continuous operation, and will not lap or mark rails. Available in metal-cased, spring-loaded, and plain designs for flat, angular and circular ways. Contact your nearest C/R Sales Engineer.

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SIRVENE: (Synthetic rubber) diaphragms, boots, gaskets and similar parts for critical operating conditions • CONPOR: Controlled porosity mechanical leather packings and other sealing products • SIRVIS: Mechanical leather boots, gaskets, packings and related products.

Blueprint for Progress ...in Metalworking

When you visit the Machine Tool Show, keep **1205** in mind. It's a good number to remember, for in this area you will see the newest machine tool products of The Cincinnati Milling Machine Co. Most of them are new from the floor up, and never before have been exhibited. All of them will be in action—many operating on actual production setups that might well have been taken from your shop. Others will be set up so that you might personally get the "feel" of the new features, and more fully realize their advantages. Cincinnati Milling's display may truly be the blueprint to your future progress in metalworking. Be sure to visit Area **1205;** you'll see new methods and equipment, and you will go away with many practical ideas which can be put to work in your shop.

Area 1205
EXPOSITION HALL

- **A** Knee-Type Milling Machines
- **B** Bed Type Milling Machines
- **C** Die Sinking Machines
- **D** Cutter and Tool Grinders, and Surface Grinder
- **E** Centertype Grinding Machines
- **F** Centerless Grinding Machines
- **G** Hydro-Tel Milling Machine
- **H** Hydro-Broach Machine
- **J** Hydroform Machine

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MACHINE TOOLS FOR MILLING • BROACHING • GRINDING • CUTTER GRINDING • METAL FORMING

CF&I's Franz: Directs a Revival

WHEN Colorado Fuel & Iron Corp. of Denver merged with Wickwire Spencer Steel Co. of New York in 1945, CF&I acquired several important assets.

Not the least was a young man who was general superintendent of Wickwire's Buffalo plant —Alwin F. Franz. He was the production man CF&I needed to direct its expansion and modernization program that has put it back in the running among the major steel producers.

Revival—When Charles Allen Jr., head of the New York investment house bearing his name, picked up Colorado Fuel & Iron for $20 million in 1944, he bought something that no one else wanted too badly. CF&I had been started by Confederate Gen. William J. Palmer in 1872 and had enjoyed a period of prosperity in steel and coal as the railroads snaked westward. Steel rail was its big product, and when the transcontinental lines were completed, CF&I faltered.

The company was purchased by the Rockefeller interests at the turn of the century. Under absentee ownership, the company deteriorated. Its mines and mills ran down. Its labor relations were poor. The Rockefellers tried in vain to unload the company but were unsuccessful until Mr. Allen came along.

Man for the Job—Soon after the Wickwire merger, Mr. Allen placed Al Franz in charge of all operations. He became vice president-operations in 1946, executive vice president in 1949 and president in 1952.

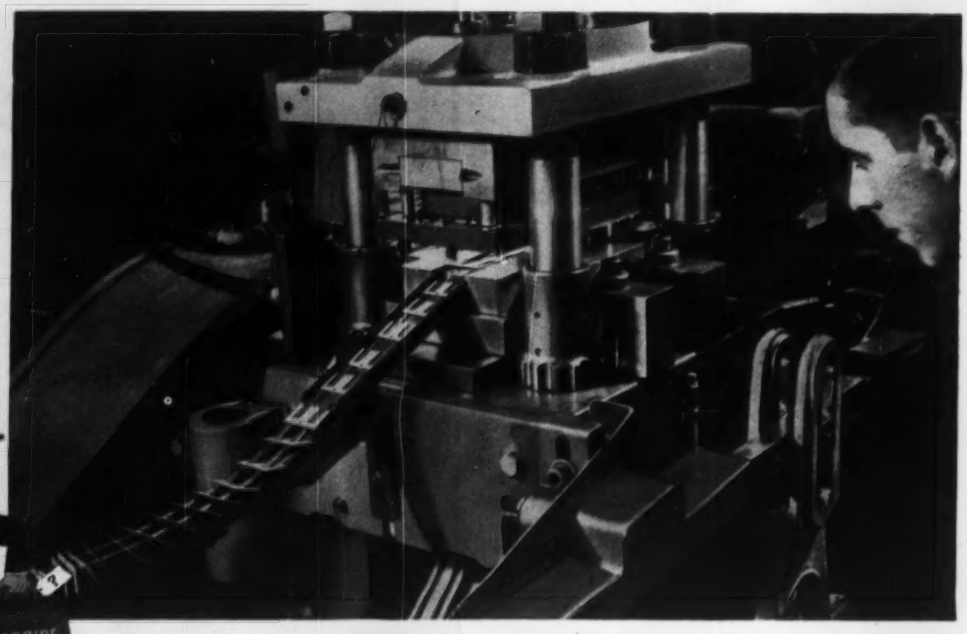
Other steel producers, steel users and investors soon became aware that things were happening in Denver, Pueblo, Colo., and other points where CF&I was operating. The company undertook an expansion and diversification program by acquisition and modernization that more than doubled its tonnage capacity in a decade while the industry was expanding only 32 per cent. It rose from eleventh to ninth place among basic steel producers. Its sales increased almost fivefold.

Lacked Capital—The rebuilding of CF&I was an uphill job. Facilities were in pretty poor shape. There was only limited capital for the modernization that needed to be done.

Al Franz countered by having his own men carry through many of the modernization jobs because that way more could be done with less money. The company acted as its own prime contractor in building its modern seamless tube mill and saved at least a million and a half. In some cases, Mr. Franz almost had to resort to baling wire repairs to keep facilities operating in balance.

"It wasn't always easy," muses Mr. Franz. "But we found that if we could keep our men enthusiastic we could do almost anything."

Photo courtesy Magnetic Metals Co. shows automatic production of power transformer laminations with DIECARB dies.



Mr. Tooley Says:

"There are two sides to every question"

CROMOVAN

HIGH CARBON—
HIGH CHROME STEEL

- **Tougher edge**
- **Better edge wear**
- **Safe to heat treat**
- **Easier to machine**

DIECARB

THE HIGH PRODUCTION CARBIDE

- **Made expressly for blanking and lamination dies.**
- **High resistance to shock and abrasion.**
- **Low regrinding cost.**
- **Greater production per die life.**

The question of which die material to use for blanking and laminating operations involves a choice of either *steel* or *carbide.* Consideration must be given to the factors which determine die life, such as abrasiveness of the material to be worked, burr limit, distortion of product or elimination of subsequent machining operations.

In the selection and purchasing of die materials, Firth Sterling offers you *unique* advantages because it manufactures *both* steel and carbide. From *one* dependable source of supply you are assured of completely *un*biased recommendations and the *right* steel or carbide or *both* for every die making need.

Typically, Firth Sterling DIECARB and Firth Sterling CROMOVAN (die steel) are widely used for blanking and laminating operations, depending upon job requirements. Write today for literature and unbiased recommendations for your specific needs.

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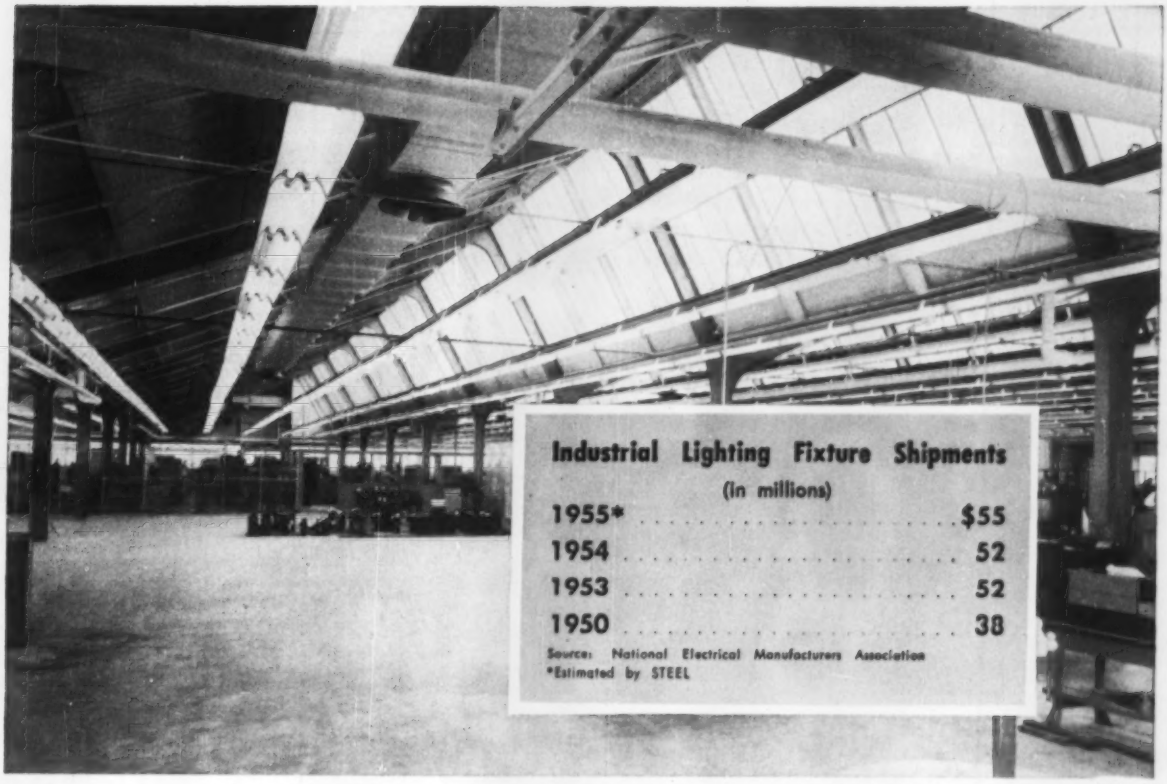


Austin Co.

Industry Brightens Visual Standards

ALERT COMPANY officials have been taking a new look at lighting. Result: 1954's electric illuminating equipment shipments reached a record $674.4 million.

Industrial lighting fixtures accounted for $52 million of the total, reports the National Electrical Manufacturers Association. W. J. Donald, managing director, NEMA, predicts illuminating equipment will continue its upward trend in 1955 sales, estimated at 1 per cent higher than last year. "This reflects continued modernization of electric lighting systems in factories, commercial and public buildings, as well as the effects of new home construction and the development of highway systems with lighted approaches," he explains.

Bright Spot—Industrial lighting fixture sales will jump some 6 per cent this year (see chart). This is due to the rapidly expanding replacement market. "Lighting equipment sales are good, better than expected," reports Westinghouse Electric Corp.

Thomas G. Hearn, sales manager of fixtures for Sylvania Electric Products Inc., reports: "Two factors point to continued good production and sales of industrial fixtures. First, good lighting is an important part of every plant that is being built or enlarged. Second, industry is more aware of the importance of good plant lighting to improve production rates, product quality and more satisfied employees."

Still Another — Pittsburgh Reflector Co. states: "In many industrial expansion programs, lighting has been the last consideration. Now management realizes it can't operate a plant efficiently day and night with poor lighting."

Outside the plant, the trend is to strong lighting at night for improved factory protection. Inside, companies are demanding easily installed and maintained units. The Benjamin Electric Mfg. Co. advises that in general-plant lighting the most recent development is to have openings in the top of fluorescent lighting units. By throwing 10 to 20 per cent of the light upward, dark recesses and shadows are eliminated.

How to Buy — Lighting equipment producers agree that most plants require individual study. The National Lighting Bureau says that fine grinding in a machine shop may require six times more light than an office.

"Probably 75 per cent of all offices need new or better lighting," say officials of the John C. Virden Co. "Because of this need and the numerous improvements in the appearance of fixtures, business looks good for the rest of this year and next."

With automotive and aviation industries among the best customers for industrial lighting equipment, producers are out to brighten up the rest of American metalworking.

How Great Lakes Steel *looks* at quality

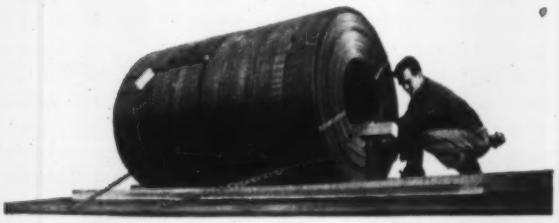
SAMPLE "PINS" from heats are sent to a special Quality Control Laboratory where analyses of previous tests by wet chemistry are double checked by spectrograph.

SPECTROGRAPH is used to make doubly certain the finished steel meets the customer's specifications. Here a densitometer reading is made of a spectrogram to determine the percentage of elements present in the steel.

Quality is something you can *see* in our modern laboratories. In the photograph above a spectrogram is readied for reading in the densitometer—and one more test is underway to help assure quality.

Precision control tests such as this one are applied at every stage of production to assure you the quality of steel required for your product and production methods.

At Great Lakes Steel, the emphasis is on quality and service. Where your production problems involve steel—and particularly flat-rolled steel—we invite you to make them *our* problems. Great Lakes Steel is as close as your telephone.



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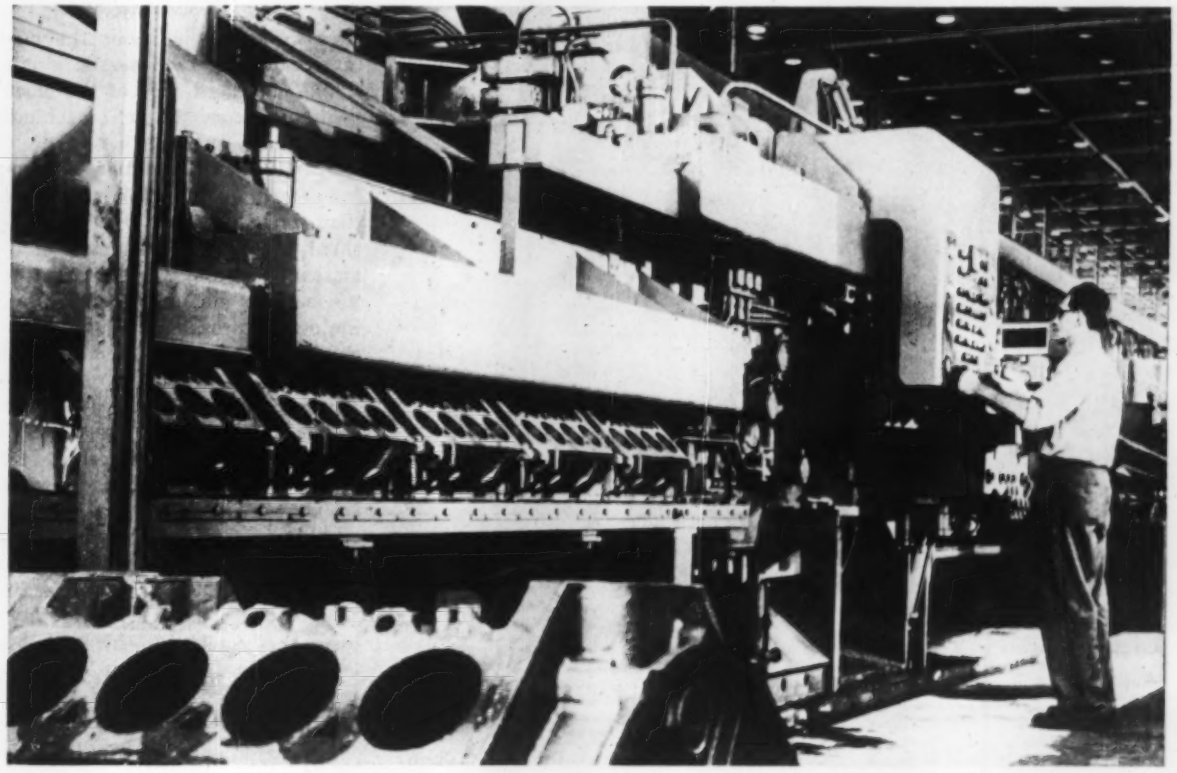

Big as a house, this machine broaches an engine block in eight operations

'Quality' Is Word for New Plymouth Plant

PLYMOUTH gets into the word-coining business with "qualimatic" to describe its new engine plant. The term might be a good addition to the metalworking lexicon. It underscores automation as a technique for producing better products at lower cost.

Since qualimatic, in the words of John P. Mansfield, Plymouth president, "is another way of saying quality control through automatic processes, this word seems to describe the entire operation." Certainly these features are significant at the new 605,059 sq-ft facility which will ultimately be capable of turning out 3000 V-8 engines daily.

Cleanliness "never before attained in an engine plant" is achieved through a system of air filters and a down-draft ventilation system that pulls cuttings and dust down into the bases of machines instead of permitting them to enter the plant atmosphere. Dust and chips are transported by drag-type underfloor conveyors to a larger conveyor at the head of each line, then to 120-ton storage hoppers for removal, while the air is filtered before recirculation.

Also Significant—The extensive use of overhead conveyors expedites and safeguards the handling of materials. All parts of the engines (except purchased items like carburetors, distributors, piston rings, etc.) are machined in the plant before assembly. These parts are carried to assembly by more than 4 miles of conveyors, making it possible to keep the aisles clear of materials and components. Colored plastic trays carrying parts help the worker select the right components quickly.

Machines and machine bases are standardized so that units of the same type can be easily interchanged. This permits replacement of the working parts of a machine and eliminates the need to shut down an operation for repairs. Also significant is the use of horizontal spindle machines that have greater accessibility for tool changes as well as greater rigidity because of the larger area supported directly on the floor.

This development of the "flat" line is particularly evident on the 560 ft automatic assembly line, a forerunner of things to come. Containing 72 separate operations, its one block assembly and two head assembly lines have many horizontal spindles.

Final Assembly — These lines, unlike others for this job, do not move continuously. Built by Cross Co., the line indexes from station to station by means of shuttles moving the assembly fixtures. Po-

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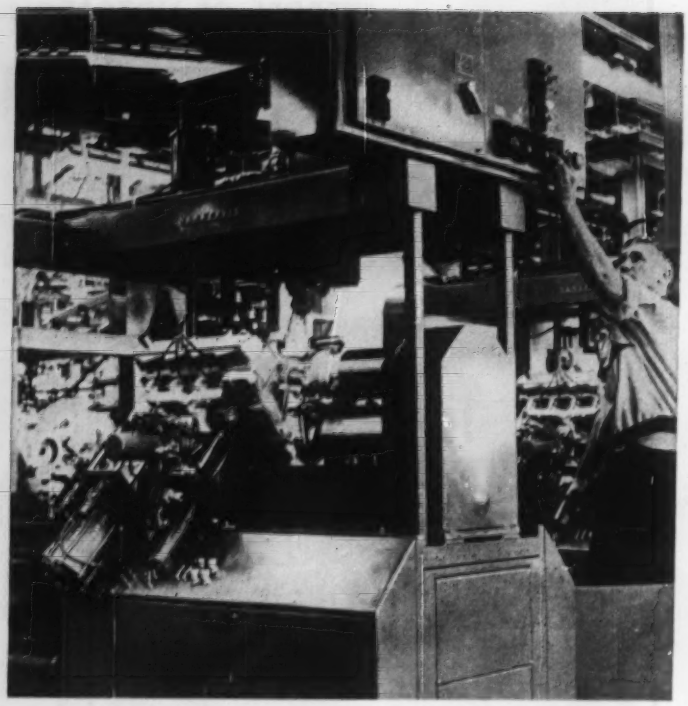

Automatic engine testing takes 20 minutes, then engines go to storage

sitioned within 0.005-in. at each station, the feeding and running of nuts are automatic. Ray McCarroll, master mechanic, estimates that about 25 per cent of the final assembly is automatic and predicts that the line ultimately will do 50 per cent of engine assembly automatically, perhaps more.

Also most remarkable are the new engine hot-test stands developed to Plymouth specifications by Nankervis Co. of Detroit (see photo). Engines are transferred automatically from the assembly area through automatic electrostatic painting to the test department, then deposited onto conveyors. They carry engines to the first open test stand. The engine transfers into the stand—ignition, carburetor, manifolds, oil and water are clamped against the engine automatically—and it is started by a cycle timer similar in principle to that of an automatic washing machine.

If the engine fails to start, a light flashes. Few engines do fail to start, however, and after 20 minutes of running, other lights flash telling the inspector the results. Approval includes visual inspection for leaks and adjustment of valves (something which indicates Plymouth is dropping hydraulic lifters in 1956). Following this automatic test run, the engine is drained of oil and water and carried automatically from the test area for shipment after carburetor and oil filter are added.

Auto, Truck Output

U. S. and Canada

	1955	1954
January	780,780	594,467
February	770,530	574,215
March	955,027	672,858
April	936 994	676,269
May	913,257	621,318
June	825,031	635,540
July	815,061†	543,344
August	.....	523,799
September	.....	364,441
October	.....	312,078
November	.....	616,395
December	.....	761,954
Total	.....	6,896,678

Week Ended	1955	1954
July 23	208,413	130,744
July 30	199,788	130,523
Aug. 6	170,004	124,168
Aug. 13	175,822	119,208
Aug. 20	170,049†	121,736
Aug. 27	126,000*	113,496

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

A huge broach, claimed to be the largest in the world, heads each block line. About 12 x 19 x 59 ft, it is about the size of a ranch-type house. A single stroke cuts both ends of the block while a second broach machines the top and bottom.

Crankshaft Automation — There are nearly 4000 ft of conveyors that move cranks from one machine to the next. Carried automatically through machining of the bearing and internal surfaces, the cranks progress through a machine that bores the oil holes and centerless grinders that grind the bearing surfaces. Not only is this setup remarkable for its automation, but the crank is designed so that if it should prove desirable to shift from a forged to cast crank, present equipment can handle the job.

An industry first is claimed in "detecto" panels. On bridgeways over the machines, these panels enable a machine operator to pinpoint the exact location of any machining trouble along the line.

Inspection equipment is liberally sprinkled along the lines. Water tests for heads and blocks and air gaging of machined diameters insure an immediate check on parts beginning to move out of tolerance and rejection of defective parts before further machining. As Carl J. Demrick, Plymouth vice president of manufacturing expresses it: "It's virtually impossible for us to produce an engine with anything but perfect parts."

Flexibility a Keynote—At the Plymouth plant, automatic banking will be provided as demands are learned through operational experience. Between machining lines, these banks will operate automatically to receive parts when a segment of the line goes down, discharging them to which line is operating, or to both when production resumes. Of a vertical conveyor type, these storage units have been planned for the setup and will be installed when exact capacity needs are determined.

The Plymouth plant is not only a splendid example of automation at its flexible best, but also of a team of men that has done a truly exemplary job of translating modern ideas to reality.

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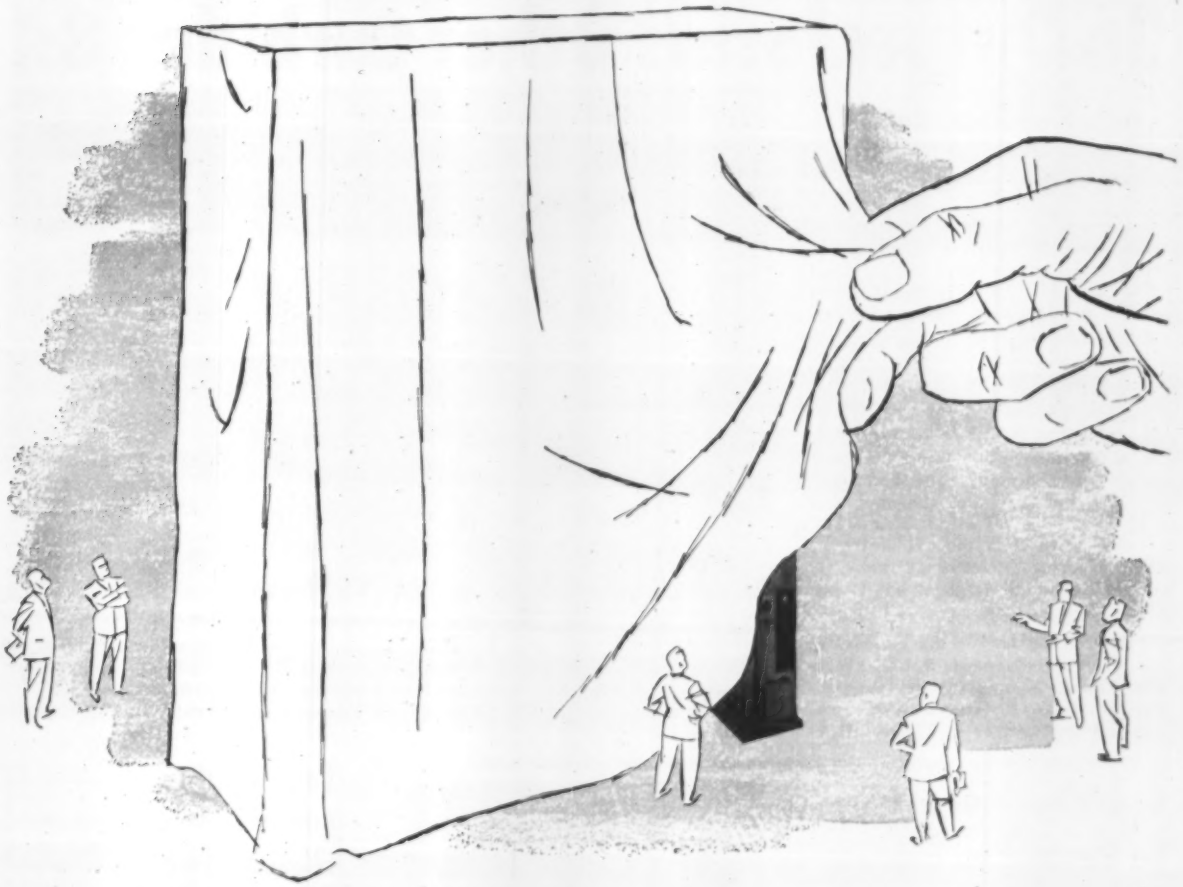

and the Unveiling of the Largest Double-Action Mechanical Press in the World

While in Chicago, during the Machine Tool Show, be sure to visit the Verson plant. Verson presses will be in operation for your examination in our new Research, Development and Exhibit Center.

Unveiling and presentation of the new Verson double-action mechanical press, the largest in the world, will take place during the Open House. It's the one event that you don't want to miss while in Chicago.

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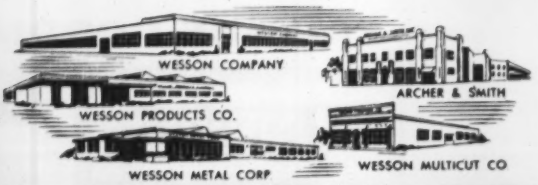
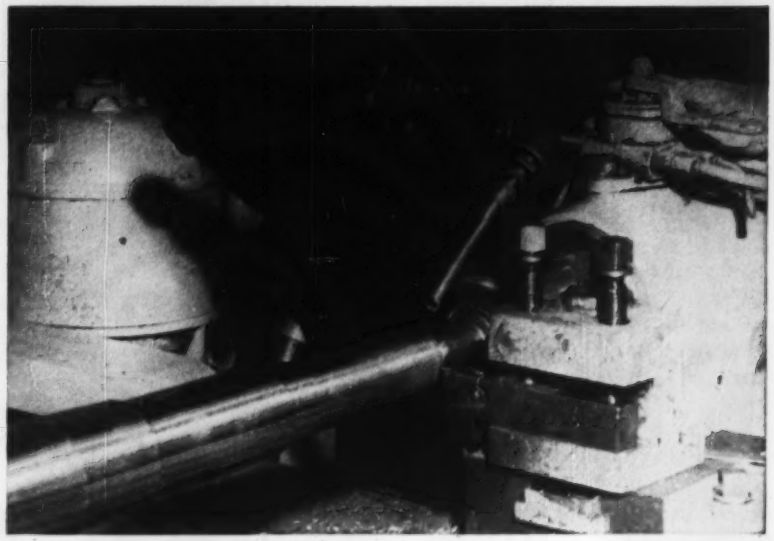
carbide NEWS



26 Outperforms Other Carbides 8:1

Boosts sprocket shaft output from 15 to 120 pieces per grind



In a series of production comparison tests, Grade 26 again came out on top—this time in machining forged steel (Rockwell 44) tractor sprocket shafts at a large midwestern tractor company.

With Wessonmetal 26, output averaged 120 pieces per grind as compared with 15 pieces per grind for all other steel cutting grades tested.

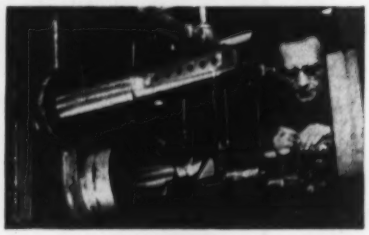
The operation is performed on a new 20" Monarch Air Gage Tracer lathe and consists of finish turning the shaft diameter, forming radii and chamfers, and rough turning all other diameters. Length of travel in the cut is 18¼"; speed 375 sfpm; feed range from .009 to .012". Average depth of cut for all diameters is ¼-inch.

Primary reason for the big increase in life achieved with Wessonmetal 26 is its ability to stand up under widely varying conditions. Inserts made of other carbides shattered or broke after 12 to 15 pieces on one cutting edge and could not be indexed. This trouble was eliminated with Grade 26, which averaged 20 pieces per edge and could be indexed to give a total of 120 pieces per grind.

Worthy of note also is that the performance of Wessonmetal 26 (a "nearly universal" steel cutting grade) was achieved in comparison even with carbides of a specialized nature specifically selected for this operation.

New Film Points Way To Better Tooling

One of the most dramatic technical sound films yet produced is now released by the Wesson Company for showings to technical and shop groups.



Built around the development of tooling for an actual job—the machining of tractor track links—the 16 mm. technicolor sound film—which took two years to complete—records the *failures* as well as the successes achieved. The trials and tribulations encountered will remind many of their own experiences.

Entitled "Tools of Abundance," the film tells how a large manufacturing committee working with Wesson tool engineers carried a specific job through to completion. It is the story of how cooperation helps to develop and improve American manufacturing methods.

This story of teamwork—supplemented by about a dozen other general machining and high production operations in the film—provides a rational approach to solving other difficult tooling problems. For a showing to YOUR company, write for the film on your company letterhead. A Wesson man will bring it to you.

tools Wesson carbide Wessonmetal

WESSON COMPANY
DEPT. AD
1220 Woodward Heights Blvd.
Detroit 20, Michigan

Tool Hints

If you have an idea that you would like to get better tool life on a job than you are getting, do these things and you may find you were right:

1. Check for vibration and chatter and eliminate all you can. Both are deadly to tool life.

2. Check whether the rake angles are correctly ground. There is a best combination for any job.

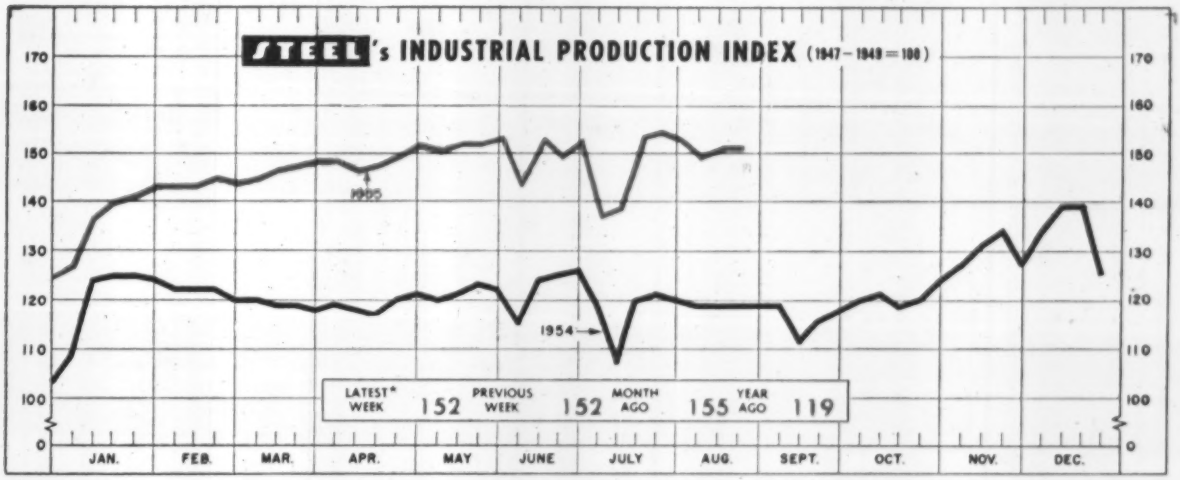
3. Check whether you have the ideal combination of speed and feed.

4. Check whether tools are changed before they get too dull. Dull tools wear faster than sharp ones. Keeping them at work is false economy.

5. Check tool after each sharpening against the tool PRINT. This is excellent insurance.

None of these suggestions are new. But they are still keys to better tool performance.

(P.S.—A sixth method is to call in a Wesson man)



*Week ended Aug. 20. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%

Businessmen Get Into the Bull Ring

BUSINESS will run at its record first-half levels for the remainder of the year. There may even be further improvement.

That's the consensus of 131 manufacturing companies, just queried by the National Industrial Conference Board.

Preview—Four out of ten expect new order volume to rise above that of the first half, though the same number expect a decline and the remainder little change. Eight out of ten respondents agree that dollar billings for the second half will surpass last year's.

Half the companies surveyed foresee second-half production rates above those of the first half, one-fourth predict declines, the balance no change. Companies that will do more hiring outnumber those that will cut back two to one. About one-fifth expect an increase in the length of the work week. Rounding out the bullish picture, over three-fourths expect pretax earnings to top 1954's, more than half plan to increase capital spending over the first-half rate. Over-all, respondents expect that dollar inventories will grow slightly in the next six months.

Measuring the Boom—Going into July, total manufacturers' inventories were below their year-ago level. Additions have been made in the last two months; more will be healthy. The hot sales pace has kept stocks of finished goods from accumulating. On a seasonally adjusted basis, they declined in the second quarter.

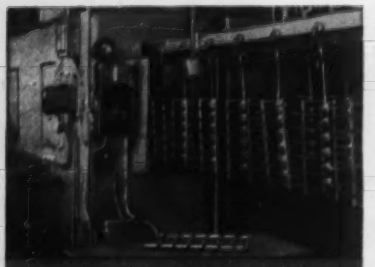
Viewed against the rate of new orders, inventories in most industries look low. During the second quarter, volume of incoming business in manufacturing was about 20 per cent above the corresponding quarter in 1954.

Cases—The Material Handling Institute reports: Though the year started slowly, by June orders rose 40 per cent above the 1954 average. Civilian aircraft shipped $34.1 million worth of planes in June. The order backlog had soared 51

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,206[1]	2,176	1,515
Electric Power Distributed (million kw-hr)	10,550[1]	10,729	9,207
Bitum. Coal Output (1000 tons)	9,325	9,150	7,760
Petroleum Production (daily avg.—1000 bbl)	6,635	6,621	6,156
Construction Volume (*ENR*—millions)	$322.2	$334.4	$258.9
Automobile, Truck Output (*Ward's*—units)	126,000[1]	170,049	113,496
TRADE			
Freight Car Loadings (1000 cars)	785[1]	775	679
Business Failures (Dun & Bradstreet, no.)	169[1]	213	246
Currency in Circulation (millions)[3]	$30,336	$30,285	$29,886
Dept. Store Sales (changes from year ago)[3]	+3%	+5%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$10,579	$18,084	$19,029
Federal Gross Debt (billions)	$277.2[1]	$277.1	$274.7
Bond Volume, NYSE (millions)	$16.7	$15.2	$16.8
Stocks Sales, NYSE (thousands of shares)	7,274	8,694	12,473
Loans and Investments (billions)[4]	$84.9[1]	$84.9	$83.3
U. S. Govt. Obligations Held (billions)[4]	$31.2	$31.1	$36.4
PRICES			
STEEL's Finished Steel Price Index[5]	207.63	207.63	194.19
STEEL's Nonferrous Metal Price Index[6]	240.7	241.1	215.1
All Commodities[7]	110.3	110.1	110.3
Commodities Other than Farm & Foods[7]	116.8	116.7	114.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



Cincinnati Owners Report

- "production 4 times as many parts daily"
- "130% more production"
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What do your part cleaning and painting operations cost?

too much? normal? don't know?

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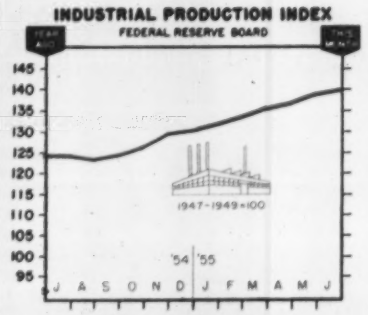
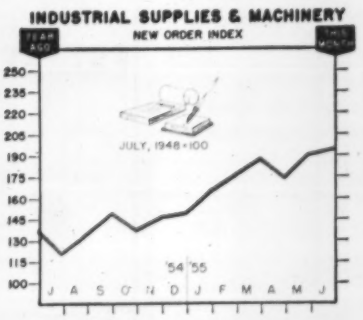
THE BUSINESS TREND





(seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1955	1954	1955	1954	1955	1954
Jan.	131	125	127	111	156	155
Feb.	133	124	131	108	157	152
Mar.	135	123	135	103	158	148
Apr.	136	123	138	104	160	146
May	138	124	140	106	162	147
June	139*	124	137*	108	163*	145
July	...	124	...	104	...	148
Aug.	...	123	...	105	...	148
Sept.	...	124	...	117	...	148
Oct.	...	126	...	110	...	149
Nov.	...	129	...	118	...	155
Dec.	...	130	...	120	...	156
Avg.	...	125	...	110	...	150

Federal Reserve Board. *Preliminary

	1955	1954	1953
Jan.	164.4	139.8	157.4
Feb.	175.1	140.5	172.9
Mar.	186.9	141.5	188.2
Apr.	173.7	131.9	182.1
May	191.6	129.4	171.1
June	194.5	136.4	160.0
July	....	119.4	155.3
Aug.	....	132.5	139.6
Sept.	....	148.1	150.6
Oct.	....	136.3	146.0
Nov.	....	146.2	144.6
Dec.	....	148.8	136.7

Amer. Supply & Machinery Mfrs.' Assn.

Charts copyrighted, 1955, STEEL

per cent above the year before. Steel shipping container makers report a 9-per-cent increase in production over 1954. All three industries enjoy good prospects for the remainder of the year.

Setting the Stage . . .

While automobile change-overs are beginning to take their annual bite from the production indexes, business in many industrial cities already is beginning to accelerate for the fall season. Pittsburgh's seasonally adjusted business index rose to 196.2 per cent of the 1935-39 average, with steel operations advancing to 95 per cent of capacity. Coal production, freight car loadings, department store and auto sales were up.

In Cleveland, activity was marked by a sharp rise in electric power production, capacity steel output and employment just 4 per cent below the 1953 peak. Settlement of labor-management disputes, new civilian and government orders and seasonal factors spurred hiring in primary metals, electrical and nonelectrical machinery, textile and other industries.

On the national scene, the Board of Governors of the Federal Reserve System notes a new industrial production record set in July. The mark, 140 per cent of the 1947-49 average, was reached as machinery manufacturers broke through records dating to 1953.

Conditions in the machine tool industry confirm the breadth and strength of business. A new report from the Commerce department on second-quarter operations shows that for cutting-type tools, order backlogs had built up to the six-month level by the end of June. For presses and other forming and shaping tools, backlogs soared to over a year.

Machine Tools Tighten . . .

Machine tool shipments for the second quarter are put at $207.6 million, compared with $201.3 million for the first. The metal forming category dropped more than $2 million under the first quarter, despite steadily mounting backlogs.

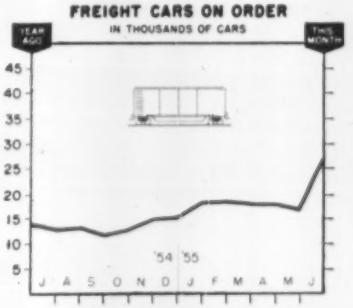
Unfilled orders in metal forming machinery jumped to $203.4 million by June, compared with $154 million at the end of the first quarter. Tightness in supply is resulting in complaints. Some customers are being converted to foreign machine tools. Completion of heavy government purchase pro-

DURABLE GOODS ORDERS, SALES
IN MILLIONS OF DOLLARS

	New Orders* 1955	1954	Sales* 1955	1954
Jan.	12,142	9,376	11,850	11,381
Feb.	12,170	9,394	12,029	11,248
Mar.	13,353	9,585	12,360	11,303
Apr.	12,879	9,619	12,806	11,160
May	14,331	9,588	13,322	11,066
June	14,044	9,822	13,525	11,293
July	.....	9,407	.....	11,153
Aug.	.....	9,756	.....	10,907
Sept.	.....	11,153	.....	10,832
Oct.	.....	10,790	.....	10,295
Nov.	.....	10,491	.....	11,314
Dec.	.....	11,963	.....	11,570

*Seasonally adjusted. U. S. Office of Business Economics

FREIGHT CARS ON ORDER
IN THOUSANDS OF CARS



	Awards 1955	1954	Backlogs (end of month) 1955	1954
Jan.	5,087	2,942	18,395	27,959
Feb.	2,690	2,057	18,633	25,441
Mar.	2,156	348	17,974	20,966
Apr.	2,706	909	17,930	17,817
May	3,041	1,071	16,886	15,615
June	13,365	1,139	27,102	13,860
July	.....	883	.....	12,889
Aug.	.....	2,425	.....	13,013
Sept.	.....	2,396	.....	11,993
Oct.	.....	2,704	.....	12,853
Nov.	.....	3,754	.....	14,805
Dec.	.....	2,685	.....	15,317
Total	.....	23,313		

American Railway Car Institute

grams and retooling in the auto industry may bring some relief by year end.

Rails Boost Spending . . .

Railroads are buying heavily in anticipation of increasing business. The Association of American Railroads reports that July orders for new freight cars rose to more than 18,000, the fourth successive month of increase. Cars on order as of Aug. 1—nearly 43,000. At the delivery rate set in the second quarter this year, this order backlog will take nearly a year to work off. It means railroad spending in excess of $320 million for cars alone. Railroads have 467 new locomotives on order, compared with 133 a year ago.

Significant facts: Factory shipments of truck trailers for the first half hit a postwar record, up 48 per cent from the same period in 1954. Freight car loadings are running about 5 per cent under 1953's through the first two weeks of August.

Autos Play Santa . . .

Automakers plan to pour money into the economy right up to the time Santa slides down the chimney. *Ward's Automotive Reports* says that the November-December pace should parallel 1954's, when December production ran at a 4½-year high.

Ford is scheduling production at a postwar record for the closing months, surpassing even its March and April efforts. Both Chrysler and GM are expected to equal their high points so far this year. More assembly plants are being readied for double-shift work. More workers will be kept on during model change-over; idle periods for others will be shorter than last year.

Trends Fore and Aft . . .

Goodyear Tire & Rubber announces record sales of $679 million, up 23 per cent from first-half of 1954 . . . Look for higher fuel costs, following $2-a-day increase for coal miners. Cincinnati, Pittsburgh and Youngstown already are paying more for fuel oil barged in long-distance from the Gulf Coast . . . United Engineering & Foundry Co. reports order backlogs reach $65.5 million . . . St. Louis San Francisco Railway starts piggyback between St. Louis and Dallas . . . Government sells back 447 freight cars to industry.

• Edited by GEORGE BLACK

NEW CATALOG AVAILABLE

Specifying stainless steel valves or fittings is duck soup with the new Cooper Alloy Catalog, available in a variety of styles and bindings. Catalog #55 can be custom tailored for every need. Here are some of the possibilities.

1. *Individual Product Booklets* . . . 12 pocket size booklets covering off-standard valves, fittings and accessories.
2. *Individual Product Cards* . . . All the data from the booklet printed on separate cards.
3. *Simplified Valve Catalog* . . . (#55 D)—64 page 6″ x 9″ catalog containing all valve information.
4. *Simplified Fitting Catalog* . . . (#55 F)—32 page 6″ x 9″ catalog containing all fitting information.
5. *Catalog Packet* . . . Catalogs #55 D and #55 F, housed in double pocket folder suitable for holding price lists and technical data.
6. *Deluxe Catalog* . . . Bound with twin plastic combs, set inside hard cover of blue buckram. Contains the 12 individual product booklets; 12 page booklet on valve design, repair and maintenance; 8 page booklet describing the manufacture of valves and fittings and a 16 page reference manual.

For the full story see your local Cooper Alloy distributor or representative, or drop a note to our Public Relations Division.

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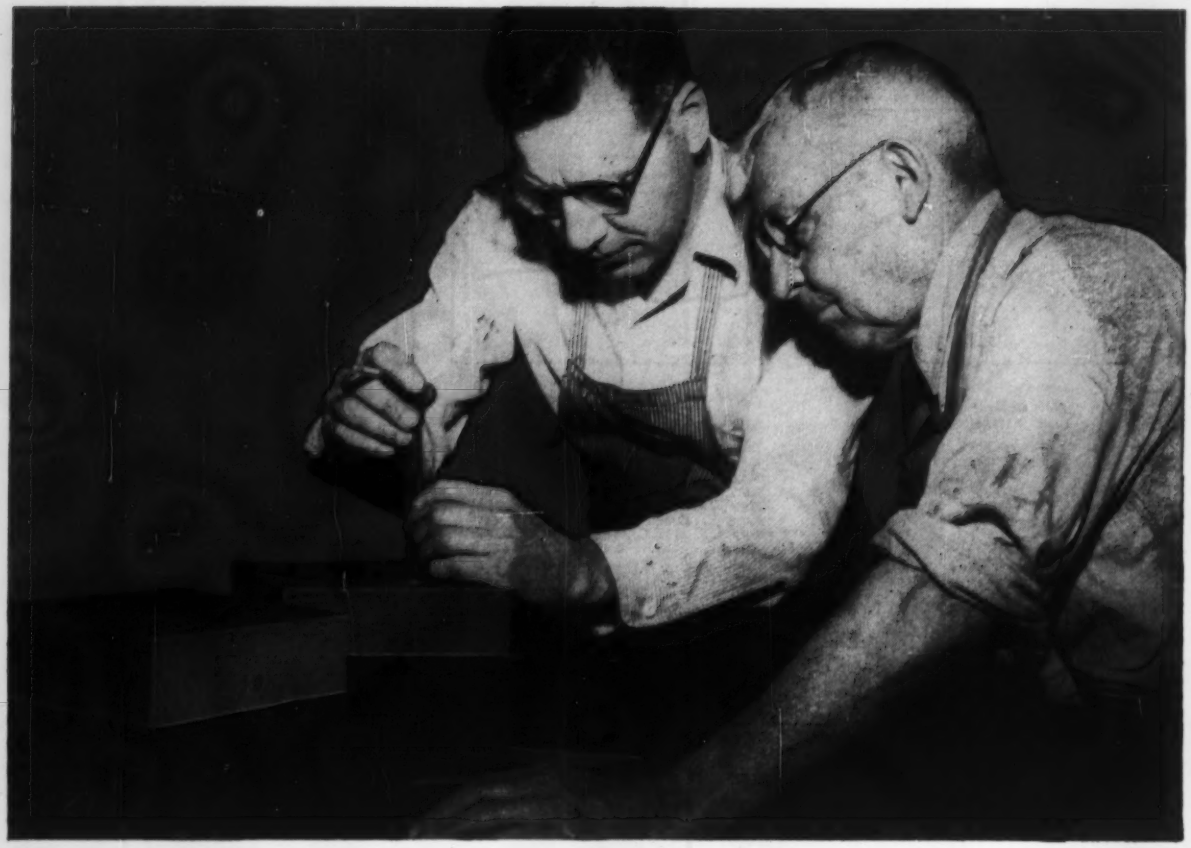

precision demands the best material

Among industry's top die sinkers, Hardtem Die Blocks have earned a time-honored reputation for dependability. Above is Mr. Justus Johnson, owner and operator of his own shop in Hartford, Conn. (He is shown with his son in the feature illustration.) Mr. Johnson, though 85 years old, still continues his daily work — applying his wealth of experience and knowledge to the trade he has worked in for so many years.

That's why users buy and rely on Heppenstall Hardtem Die Blocks—for the consistent performance they can trust.

Here's what Hardtem Die Blocks mean to Better Production!

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HEPPENSTALL

. . . the most dependable name in die blocks

JOHN P. LALLY
. . . president of Copper Range Co.

John P. Lally succeeds the late **Morris F. LaCroix** as president of **Copper Range Co.**, Boston, and its subsidiary, White Pine Copper Co. He has been president of C. G. Hussey & Co., a division at Pittsburgh, and also senior vice president and director of the parent company. **J. S. Leonard** was made vice president of Copper Range; **J. R. Lally** and **J. G. McNeely** assistant vice presidents.

Clare A. Best was made director of quality control for National Lead Co.'s **Titanium Alloy Mfg. Division** at Niagara Falls, N. Y. He is succeeded by **Karl W. Traub** as chief chemist.

D. A. Cameron, industrial sales manager, **Parker Appliance Co.**, Cleveland, was appointed general sales manager of the firm's three industrial divisions, tube and hose fittings, rubber products and industrial hydraulics.

Robert L. Cleveland was made manager of operations, **Tonawanda Iron Division**, American Radiator & Standard Sanitary Corp., North Tonawanda, N. Y.

Allis-Chalmers Mfg. Co., Milwaukee, named **Leon Decker** assistant works manager of its foundries and pattern division. He succeeds **Anthony Lebesch**, now works manager of the division.

VINCENT J. POWERS
. . . heads Accurate Bushing Co.

Vincent J. Powers was elected president and general manager, **Accurate Bushing Co.**, Garwood, N. J. He was with the sales organization of Ex-Cell-O Corp.

George N. Decker was named first vice president of **American Brake Shoe Co.'s** Kellogg Division, Rochester, N. Y. **Fred L. Cogswell** succeeds **William H. Starbuck** as vice president, Kellogg Division. Mr. Starbuck was named vice president of the Sintermet Division at Cleveland.

Curtis J. Yamas was elected vice president-sales for the newly formed **Continental Appliances Division** of Chelsea Products Inc., Plainfield, N. J.

Harry G. Westerfield joined **Ballymore Co.**, Wayne, Pa., as sales manager. He has been with the National Association of Manufacturers over ten years and most recently handled public relations in the Middle Atlantic regional office.

Norman C. Michels succeeds **Arthur B. Haswell**, retired, as vice president-engineering, **Tennessee Coal & Iron Division**, United States Steel Corp., Birmingham, effective Sept. 1.

William A. Millard was made sales manager, **Webb Wire Division**, Carpenter Steel Co., New Brunswick, N. J.

JOHN T. ROBINSON
. . . Greer Hydraulics div. sales post

Greer Hydraulics Inc. appointed **John T. Robinson** sales manager of its products division which has offices at New York International Airport at Jamaica, N. Y. Mr. Robinson was formerly a marketing consultant with McKinsey & Co. and general sales manager of Wall Rope Works.

William E. Porter was made assistant district sales manager at Pittsburgh for **Jones & Laughlin Steel Corp.** He was office manager-general sales. **David M. Griffith** was made Houston district sales manager to replace **D. J. Ambrose** who transferred to the St. Louis district sales office.

Robert E. Harvey on Sept. 1 becomes executive vice president and assistant to the president of **Merritt-Chapman & Scott Corp.**, New York. He is succeeded by **Alfred P. Miller** as M-C&S executive vice president-steel division and as executive vice president and general manager of Newport Steel Corp., a subsidiary. Mr. Miller, former vice president-operations at Newport Steel, also was named to the board of directors to succeed **W. J. Mericka.**

Devereaux Martin was elected vice president and director of engineering, **Viking Instruments Inc.**, East Haddam, Conn.

C. E. Hartsing was made manager of field sales for **Toledo Pipe**

ALFRED CIANFARANI
. . . National Copper & Smelting plant mgr.

R. D. JACOBS II
. . . Custom Die sales manager

EDWARD G. KOMINEK
. . . Infilco Inc. gen. sales mgr.

Threading Machine Co., Toledo, O.

Alfred Cianfarani was appointed plant manager, **National Copper & Smelting Co.**, Cleveland. He will direct plant and production operations. **Guy Hastings** was made general superintendent in charge of manufacturing procedures and personnel.

Paul Hutchinson was made sales manager, laboratory instruments division, **Perkin-Elmer Corp.**, Norwalk, Conn. He was sales manager at Baird Associates Inc.

Edward J. Richardson was appointed manager, tubular products and cold finished bar division, **Joseph T. Ryerson & Son Inc.**, Chicago. He succeeds **Allen P. Beckloff** who is now manager of the Ryerson plant in Boston.

Smooth-On Mfg. Co., Jersey City, N. J., appointed **George T. Morse** vice president and director of sales. He was with U. S. Gypsum Co.

David C. McVey joined **Climax Molybdenum Co.**, New York, as a sales development manager. He was a metallurgist with International Harvester Co.

R. E. Bastian was named manager of the mechanical building of **Firestone Tire & Rubber Co.**, Akron.

Herman Plone was appointed chief engineer of **Aircraft Standards Inc.**, North Hollywood, Calif.

R. D. Jacobs II, formerly with the marine engine division of Reo Motors Inc., joined **Custom Die Co.**, Lansing, Mich., as sales manager.

Edward F. O'Shea was made chief industrial engineer, **Allied Products Corp.**, Detroit. He was plant manager and assistant to the president of A. T. Ferrell & Co. **R. F. Jalbert**, a district sales manager for Taft-Peirce Mfg. Co., joined Allied as a sales engineer.

Kerr-Lakeside Industries Inc., Euclid, O., promoted **L. M. D'Onle** to sales manager and appointed **Harold S. Olson** purchasing agent and production manager.

Edward G. Kominek was made general sales manager of **Infilco Inc.**, Tucson, Ariz. He has been assistant sales manager since 1950.

Philip C. Kosch was made sales manager, **Bryant Division**, Carrier Corp., Indianapolis.

William M. Taylor was appointed assistant general manager, **Laclede-Christy Division**, H. K. Porter Company Inc., St. Louis.

A. K. Brill retires Sept. 1 as development manager at **Republic Rubber Division**, Lee Rubber & Tire Corp., Youngstown. **J. P. Mathews** was promoted to chief

L. M. D'ONLE

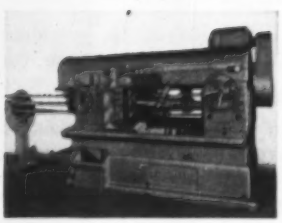
HAROLD S. OLSON
. . . Kerr-Lakeside Industries appointments

First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.



Conomatic

THE MACHINE TOOL SHOW
CHICAGO, ILL.
BOOTH 401

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

BENNETT BURGOON JR.
. . . Kennametal sales manager

HOWARD J. DAVIS
. . . heads Borg-Warner divisions

CLAUDE A. MARLOWE
. . . Pittsburgh Metals Purifying post

chemist and will assume the duties formerly handled by Mr. Brill.

Bennett Burgoon Jr. was appointed sales manager of **Kennametal Inc.**, Latrobe, Pa. He was sales manager of the metalworking division.

A. L. Martinson was made hardware sales manager, **Atkins Saw Division**, Borg-Warner Corp., at Indianapolis.

John W. Price Jr. was made assistant general superintendent, Duquesne, Pa., Works, **U. S. Steel Corp.** He succeeds **Edgar B. Speer**, transferred to the Fairless Works as an assistant general superintendent.

Torrington Co. appointed **Donald E. Lewis** sales manager and **Raymond G. O'Connell** assistant sales manager of its bearings division at Torrington, Conn. **Clarence H. Rowe** was made sales manager and **C. R. Johnson** assistant sales manager, needle division.

Howard J. Davis succeeds **W. B. Caldwell**, retired, as president of **Borg-Warner Corp.'s** Calumet Steel (Chicago Heights, Ill.) and Franklin Steel divisions (Franklin, Pa.). Mr. Davis previously served Colorado Fuel & Iron Corp. as assistant to the president.

Walter L. Flanders was made works manager, **Wales-Strippit Corp.**, North Tonawanda, N. Y. He was production manager from 1952 to 1954 when he joined Curtiss-Wright Corp. at Buffalo as production control superintendent for its metals processing division. Before returning to Wales-Strippit, he served for a short time as production manager, American Machine & Foundry Co., at Buffalo.

Louis A. Ringman was made fabrications manager at the Claymont, Del., plant of Colorado Fuel & Iron Corp.'s **Wickwire Spencer Steel Division.**

Fred A. Smith was made sales manager for San Francisco area by **American Can Co.**

Claude A. Marlowe was elected executive vice president, **Pittsburgh Metals Purifying Co.**, Pittsburgh. He joined the firm as sales manager in 1949.

John P. Tansey was made manager of engineering sales for the industrial and marine divisions of **J. A. Zurn Mfg. Co.**, Erie, Pa.

At **Landers, Frary & Clark**, New Britain, Conn., **E. Curtis Ambler** was promoted to the new post of supervisor of engineering laboratories. He is replaced as superintendent of quality control by **Kenneth E. Ericson. Wilfred F. Croft** was named electrical projects development engineer; **Neal W. Cox**, development engineer; and **Lewis D. Plasko**, chief inspector of the electrical appliance division.

John D. Harper was made assistant general manager, smelting division, **Aluminum Co. of America**, New York. He is replaced as works manager of the Rockdale, Tex., smelting plant by **R. R. Sugg**, former production superintendent.

OBITUARIES . . .

E. Von Hambach, 62, research and development engineer, **Carpenter Steel Co.**, Reading, Pa., died Aug. 11. He was a pioneer in development and fabrication of stainless steel.

Henry O. Schultz, 64, president of **Northwest Tool & Engineering Co.** and **Wisconsin Drill Head Co.**, Milwaukee, died Aug. 11.

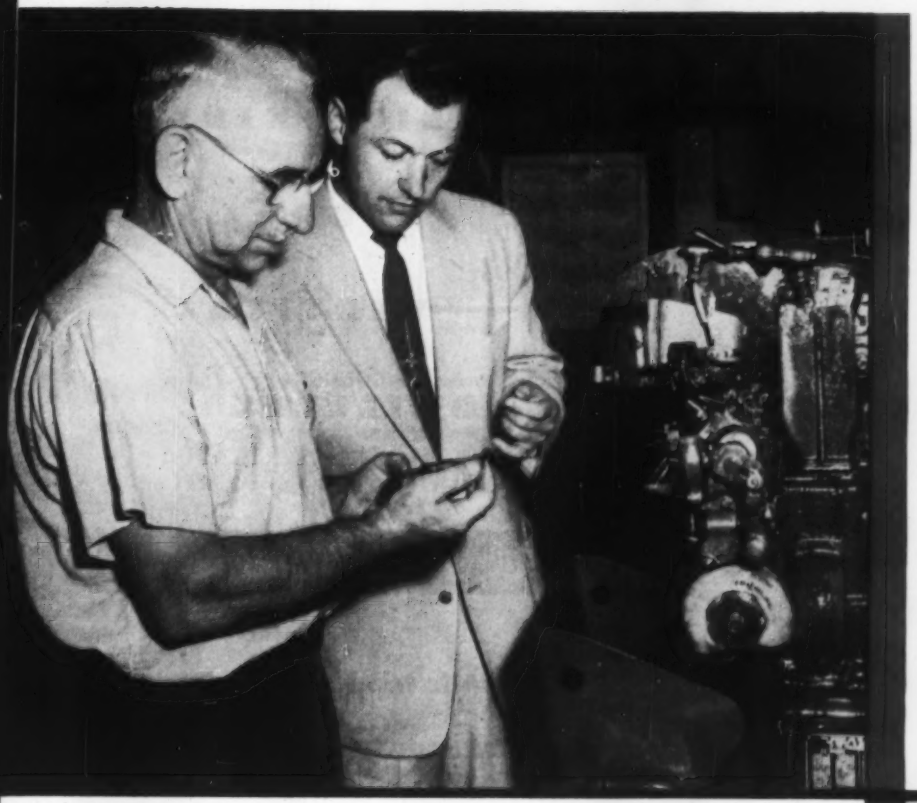
Herbert J. French, 62, vice president, **International Nickel Co. Inc.**, New York, died Aug. 17.

Lawrence C. O'Brien, 44, former purchasing agent for **Samson United Corp.** and the **A. O. Smith Corp.'s** Rochester, N. Y., division, died Aug. 8. He most recently was with **Aero Industries Inc.**

William F. Eichfeld, 75, president, **William F. Eichfeld & Sons Co.**, Milwaukee, died Aug. 14.

Kenneth C. Seadeek, 41, assistant metallurgist at the Lackawana, N. Y., plant of **Bethlehem Steel Co.**, died Aug. 9.

The story of 5 benefits Wayne Screw Products gets from using STANICUT CUTTING OIL



Plant Foreman Al Ziegman (left) and Standard industrial lubrication specialist L. J. Loomis examine pitch diameter of screw threads. L. J. Loomis' engineering background plus his field experience in industrial lubrication, customers find, pays off *for them*. Lee is a graduate of Tri-State college of Indiana with a B.S. degree. Before entering field work, he completed Standard Sales Engineering School.

STANICUT Oil 137 BCS solved finish problem for Wayne Screw Products Company, gave better finish on screw and machined parts like these—plus four other important benefits.

Management at Wayne Screw Products Company, Detroit, found they were not getting a completely satisfactory finish on aircraft quality stainless steel, which the plant was machining. They followed a suggestion made by their Standard Oil lubrication specialist to switch to STANICUT Oil 137 BCS. The result: five benefits.

1. Better finish
2. Higher quality work
3. Longer tool life
4. Higher production because of less down time for tool sharpening and adjusting
5. Cutting oil costs reduced approximately 50%

At first STANICUT Oil 137 BCS was used in two automatic screw machines—a National Acme Multi-Spindle and a Brown & Sharpe Single Spindle. Production benefits prompted Wayne Screw Products to convert other equipment to STANICUT Oil 137 BCS—and with similar results.

Delivering benefits like this is an old story for STANICUT Oil 137 BCS. A Standard Oil lubrication specialist will be happy to demonstrate how Standard's cutting oils can perform with similar results for you. In the Midwest, a call to your nearby Standard Oil office will bring a prompt response. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY
(Indiana)

announcing

TAPE-CONTROLLED POSITIONING FOR VERTICAL DRILLING

the ARTER JIGMATIC

- ***economy for short or long runs***
- ***fully automatic tape control***
- ***set-up time cut up to 600%***
- ***no jigs, fixtures***
- ***high accuracy***

Now you can get full-time production from expensive vertical drilling equipment! This fully automatic, tape-controlled positioning table — the ARTER JIGMATIC — cuts set-up time to a tiny fraction of that required by any other positioning method. Full automatic positioning at the touch of a button, for any number of hole locations. No jigs, fixtures — no stops to set — just high accuracy, fast, economical production. For use with standard radial drills or other suitable spindles.

See this Show stopper at Booth 1308.

Yours! Complete information on the ARTER JIGMATIC automatic, tape-controlled positioning table.

Write for Bulletin S 55a.

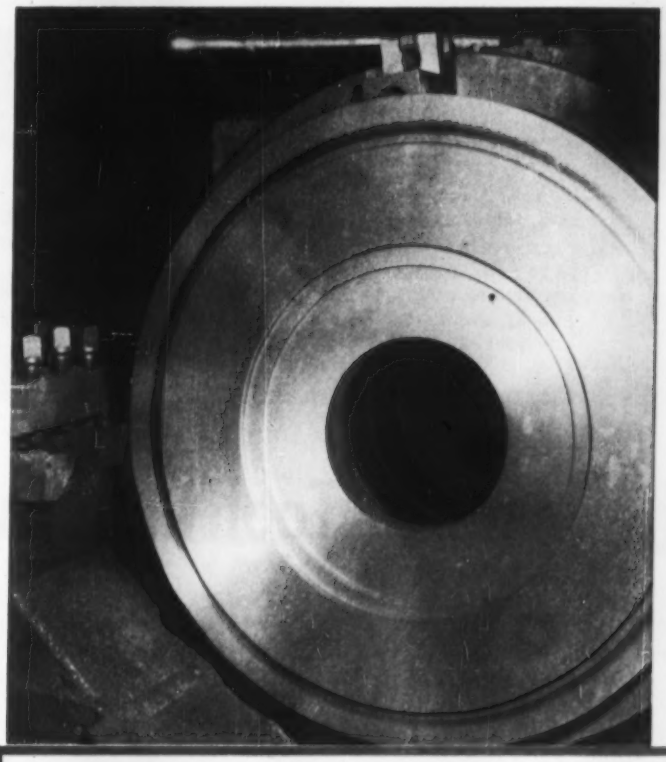
ARTER grinding machine company | WORCESTER, MASS.

STEEL
The Metalworking Weekly

PRESENTS . . .

THE MACHINE TOOL SHOW SECTION

Replacement business is the blue-chip market for machine tool builders. The 1955 Chicago shows will serve as productivity supermarkets—designed to prove to you that new machines have made their predecessors obsolete by beating them on all counts: Production cost, quality and quantity



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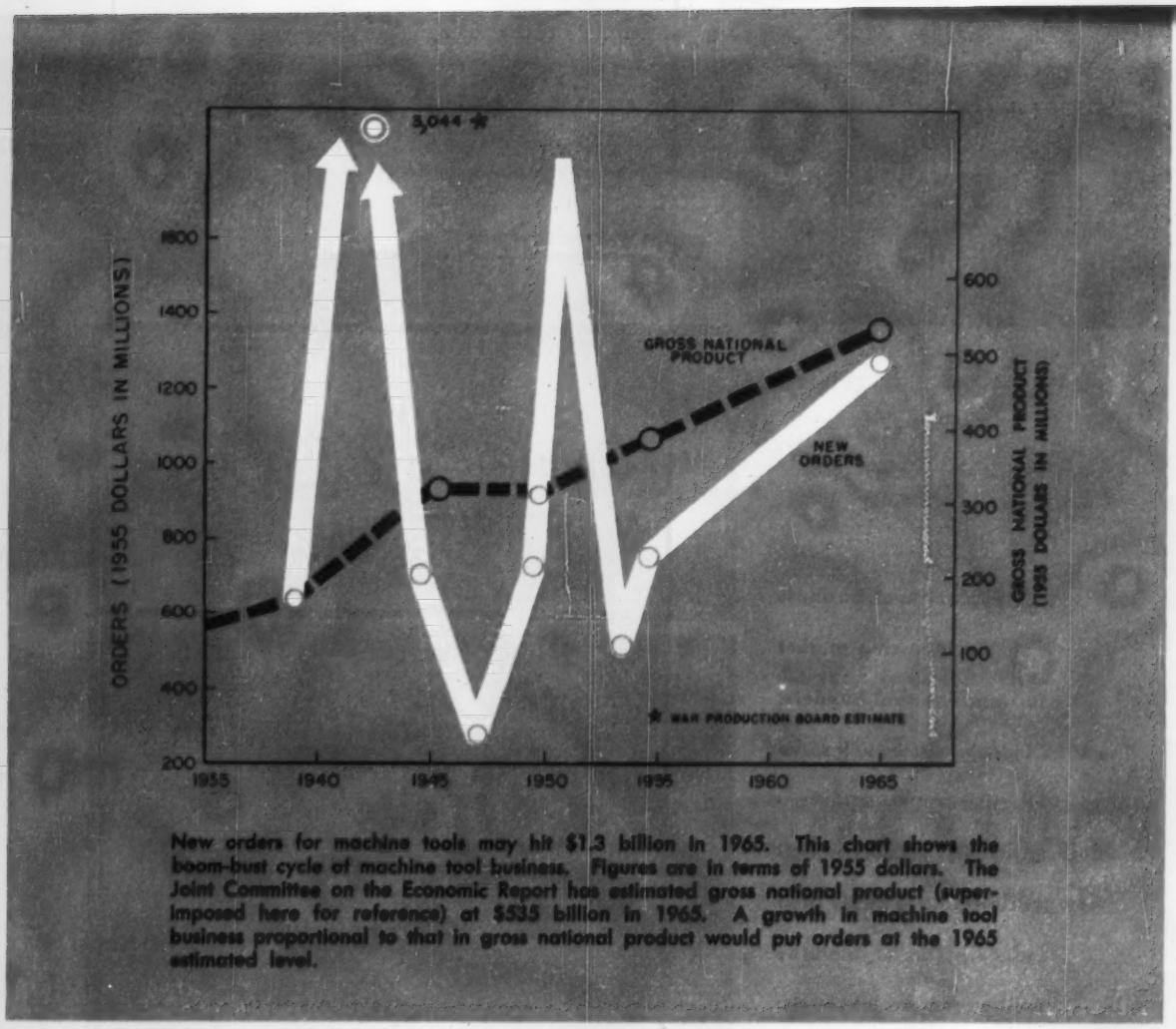


New orders for machine tools may hit $1.3 billion in 1965. This chart shows the boom-bust cycle of machine tool business. Figures are in terms of 1955 dollars. The Joint Committee on the Economic Report has estimated gross national product (superimposed here for reference) at $535 billion in 1965. A growth in machine tool business proportional to that in gross national product would put orders at the 1965 estimated level.

The Machine Tool Industry Looks Ahead

IN 1925 the average automotive production worker ran a hand-operated machine. Precision parts had final tolerances of about 0.002 in.

If the worker ran a vertical boring mill, maybe it had a special cradle that took cylinder castings from a conveyor line.

He tilted the cradle to the vertical, shoved the casting onto the worktable, machined it, pushed the casting back to the cradle, tilted it and pushed it onto another conveyor. The fact that he didn't have to lift the part made his operation spectacular.

Then—That was the year economists boasted that this industry would produce at least 3.6 million automobiles.

The machine operator would earn enough (gross) in 1600 working hours to buy one of these cars.

He would gross enough in 850 working hours to buy a refrigerator.

The industry, including parts and accessories plants, provided jobs for 400,000 workers.

Now—The job above no longer exists. Machine operators are patrolmen. They watch the machine for trouble. They keep it filled with good tools and workpieces. They keep it cutting to tolerances (0.0002 in., a zero has been added). The machine does the rest.

The operator earns enough in 680 less-strenuous hours to buy a car.

In 120 hours he can buy a new refrigerator.

Today's automotive industry employs nearly a million persons. It's turning out 8 million cars a year, about one per year for every 20 persons in the U.S.

Far Reaching—The same progress can be told of the rest of American industry. The "why" of it is no secret.

To stay alive in a competitive market, you either add to quality or you lower the cost of the product—many times both.

A 1955 car would cost $50,000 to build by 1925 methods. At that figure, the manufacturer couldn't find a market. As costs are lowered—or quality is upped—or both—markets broaden. The

industry booms.

Case in Point—Thompson Products Inc., Cleveland, decided in 1925 that it couldn't afford the 600 employees on its valve line. "Improve the efficiency of our operation and we can cut down our number of employees," officials reasoned.

Along with the rest of the automotive industry, Thompson souped up its production line, improved its valves. More valves were sold.

Thompson now has 2500 workers on the valve line. Productivity per worker is about twice what it was in 1925.

Works Two Ways—As the user of modern machine tools prospers, so does the builder of tools. Barring an economic calamity, builders can figure on a healthy assist from the upswing over the next ten years.

It figures this way: By 1965 there will be 190 million people in the country. There are 165 million now. The estimated gross national product in 1965 will be about $535 billion. It's $375 billion now.

Translation—Any way you look at it, it spells growth, an economy that will consume metalworking products at a higher rate than ever before. There's already talk of a 10-million-unit car year. Purchases per head will continue to grow as buying power improves.

This consuming economy will tighten the cost shackles on industry. Any competitive, progressive plant that delays buying the best equipment for its operation, first ceases to be progressive. Then it ceases to be competitive.

This year's machine tool shows are designed to prove that yesterday's machines already are obsolete. It gives management an unparalleled chance to shop supermarket fashion, for better ways of winning tomorrow's production race.

Key—"Remember, it's not taking them out but keeping them in that makes old machine tools so expensive."

Twenty years ago that message appeared in STEEL's Machine Tool Show issue. In those days the biggest potential nugget for machine tool sales was the replacement market—the displacement of obsolete machines in metalworking plants.

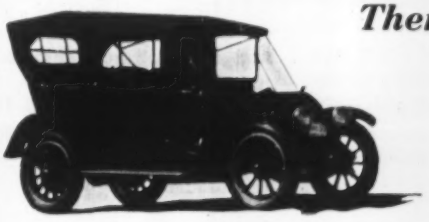
Same Story—Machine tool builders find themselves facing the same old acquaintance. The replacement market still is their prime target.

If they can crack it, there'll be no bust to the machine tool cycle for the next 20 years. A general depression to the contrary, they'll be able to replace, redesign and rejoice.

Enough For All—Nearly a half million machine tools in use today were bought before the 1935 Machine Tool Show. At present capacity, it would take the industry seven years to replace those obsolete machines. Builders' plants could work for seven years without selling a single machine for defense, for new facilities or for export. And at the end of that time, they would not be caught up with replacement.

All machines that are 13 years old now would be 20 years old then, and presumably ready for replacement. Others, less than 20 years old but obsolete and inef-

Then and Now



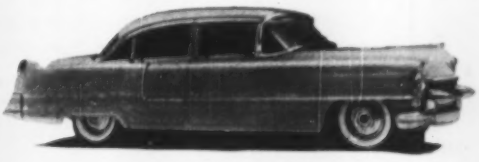
1913 Cadillac

Price: $5300* f.o.b. Detroit

(Original cost: $1975)

Engine: 4-cylinder
50 hp maximum

Each cylinder was separately cast and machined, then bolted to the block.



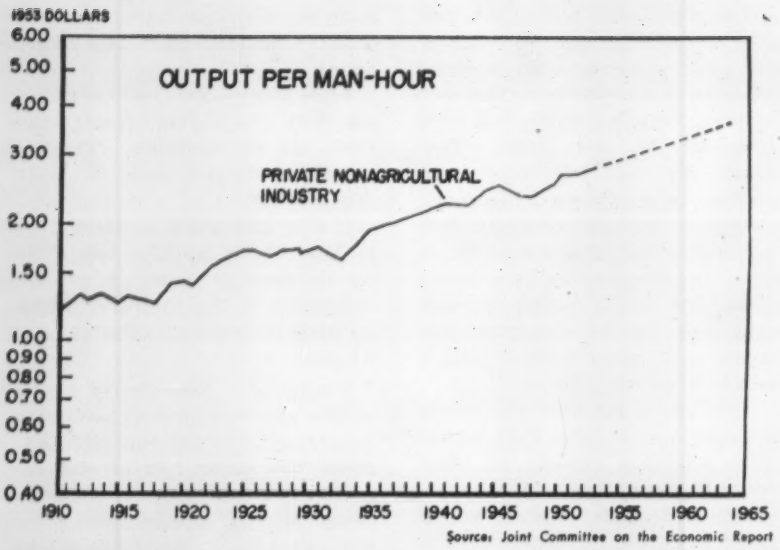
1955 Cadillac

Price: $3976 f.o.b. Detroit

Engine: V-8
250 hp maximum

Cast V-8 block is machined as a single component

***(1955 dollars)**



Source: Joint Committee on the Economic Report

Productivity per worker is constantly being pushed up by new equipment and techniques. This chart shows the trend of output (gross national product) per man-hour in nonagricultural, private industry. The rate of increase has averaged about 2 per cent per year. Future developments in equipment, including machine tools, are expected to accelerate the rate to a 2½ to 3 per cent per year improvement.

ficient, also would be ready for replacement.

Plan of Attack—Putting inefficient machines out in the alley is not so easy as it sounds.

First, metalworking management must be convinced that it's both wise and economical to operate their plants on a lowest-cost-per-piece basis.

Second, part of the machine tool sales job must be done on the designers' drawing boards. New machines must show a sufficient advantage over the old to make it essential for the user to change.

Contrast—Many builders frankly admit that their 1955 machine tools were designed to obsolete any they've built before. In STEEL's 1935 Machine Tool Show issue, one builder announced a new lathe that had a top speed of 730 rpm. This year a similar lathe was introduced. Top speed: Over 1700 rpm.

Carbides in 1935 were more conversation pieces than cutting tools. Few machines were designed for carbide cutting; none of them was set for carbides as we know them.

Selling Savings—Most builders point out that their primary product is savings for their customer. The machine tool is just the device. If they can't offer the buyer a better method for making his product, there's no excuse for his buying. Looking at it from another direction, if they *can* better his operation, there's no excuse for *not* buying.

Savings can be in the form of cost cuts that can be put in the till. They can also be in the form of a better product, or simply more products per hour.

Simplified—A continually growing economy will make easier the machine tool buiders' task of selling their customers on replacing new machines for old. That's half their job.

The other half, designing improved machines that obsolete predecessors, will come as builders, freed from the wartime rush, find new production problems in every customer's plant, and have the time to solve the problems.

Effort—Ten years from now, the largest single area of production improvement will have been the reduction of man effort. Automation (properly tagged by a dozen names) is the development most likely to succeed in knocking the machine tools of the '40s and '30s from their production pinnacles.

Formula for Success: Take an economy that's growing smoothly and surely. Add a metalworking industry that is eager for new techniques that'll take the backlash out of production costs, plus machine tools that will make the techniques possible.

With that set of facts the next ten years bid fair to be the best in the history of the machine tool industry. By 1965, new orders can come in at the rate of $1.3 billion a year. The consequences go even deeper.

End Product—The single function of machine tools, to produce better things more efficiently, is the foundation on which our high standard of living is built. No agricultural country, no hand-operated economy has ever had a high standard of living. It takes industry—and the more efficient and productive the industry, the higher the standard of living.

WHAT'S AHEAD?

Machine tool builders and users commenting in forums in this issue pick these points as most important for future development in equipment.

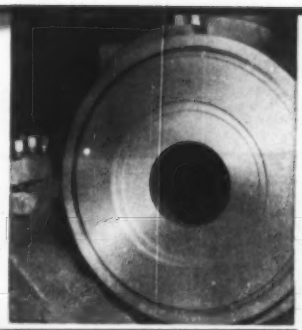
More Flexible Standard Machines: Most frequent point mentioned in both forums concerned emphasis to be placed on the standard machine tool. More automatic controls, centralized manual controls, simpler and faster setup and change-over were stressed.

Integration of Handling and Machining: More automatic handling of workparts is a certainty. Look for heavier emphasis to be placed on standard and semistandard machines.

Standardized Special-Machine Units: Transfer machines will be built up from standard units. Changes in part design will be accommodated by adding, subtracting or repositioning units. The aim is to lengthen useful life of the machines, cut conversion time and cost.

Automatic Gaging and Control: Both standard and special machine tools will incorporate more gages to measure workpiece size continuously. In many cases, size readings will signal the machine for tool control or for cycle stop.

Design for Maintenance: Motors, hydraulics, pneumatics and electric control circuits will be made more accessible. Many components will be mounted outside the machine. Others, mounted inside bases and columns, will swing or pull out within easy reach.



The Builders' Viewpoints

Each of these top executives in the machine tool industry was asked to give you his ideas on assigned subjects—future machine developments, the outlook for export business, equipment replacement factors, new write-off allowances or machine tool leasing plans. Here is their thinking

Mechanization Will Depend On Economics

EVERETT M. HICKS
Vice President, Norton Co.
Worcester, Mass.

A recent article suggests the term "automation" should receive an award as the outstanding cliché of 1955. This term has been greatly abused. Some people have gone so far as to hail automation as the advent of a new industrial revolution.

All that is taking place is a continuation of a trend which has been evident to machinery manufacturers for years. This trend involves the increasing incorporation of operator skills into the design and controls of machines, coupled with the introduction of automatic loading and unloading of workpieces.

How far should a company go in introducing this mechanization? While the pushbutton plant may not have arrived in most industries, it probably is not because our engineers are incapable of producing it. The cost of designing and building such plants would be prohibitive when viewed in relation to possible economies and because of potential obsolescence in the facilities due to changes in product design.

Mechanization will proceed only as far as practical economics will permit. If we define our objective as the production of more and better goods at lower cost, our equipment policies must serve this objective.

Obviously, the highest degree of mechanization can be justified in those cases where there is a large volume of production and where the labor content of the product cost is fairly high. Usually, specially designed single-purpose machines can be justified because of their high productivity. The cost of such machines in terms of units produced is small when spread over a large volume. Even here it is well to pay strict attention to the flexibility of design of these special machines, so that reasonable changes in product design can be accommodated.

At the other extreme is the company which manufactures a variety of products in comparatively small lots. Here the general-purpose machine is best suited because of its flexibility. Possibly one of the greatest areas for future increase in productivity lies in improved control of these standard general-purpose machines to permit more rapid changeover and increase the ratio of cutting to setup time.

KIRKE W. CONNOR
President, Micromatic Hone Corp.
Detroit

"... trend is toward precision products produced in greater volume"

The highly competitive market for all types of manufactured products is influencing the current trend in machine tools.

With rising costs heightening the competitive picture, the trend is toward a more precision (efficient) product produced in greater volume. Designers are increasing the loads, pressures and speeds that must be withstood by the bearing and sealing surfaces; more critical specifications and tighter tolerances are being written for all important functional surfaces.

The answer seems to lie in the use of the most economical mass-production techniques. Millions of parts must be held to tolerances of millionths of an inch. The point has been reached where the human hand is incapable of economically producing either the tolerances or the volume required.

Conversely, the machine tool has stepped far beyond its primary role of performing a machining operation. It loads its own parts, locates and clamps them, performs to the required tolerances, checks and passes them on to the next operation—all automatically.

No longer considered separate units, machine tools must be designed as part of a production line. Precision and production requirements are obsoleting lines that constantly require tool sharpening—checking of alignment—maintenance.

Newer processing methods are eliminating many production problems. New controls, tools and techniques are continuously being planned and developed.

The manufacturer who does not avail himself of the latest thinking of the machine tool builder each time new equipment is needed—no matter how frequently—is losing an opportunity to keep his processing on the most efficient level and is weakening his competitive position. As the functioning of the machines on a line must be integrated, so must the efforts of the user and builder.

J. A. RATERMAN
President, Monarch Machine Tool Co.
Sidney, O.

"... machine development depends on speed, accuracy and confidence"

Perhaps no other factors have been more important in the development of modern machine tools and manufacturing in recent years than speed, accuracy and confidence. Upon these three vital requirements has been built a fantastic industrial age and a fabulous standard of living. New and more difficult operational problems are presenting themselves every day, yet in the future, as in the past, solving them will continue to hinge largely on more speed and more accuracy.

The trend is toward higher speeds, increased speed range, easier and quicker speed change, all of which help put more workpieces on the floor in an hour. Tracer devices, automatic cycling, automatic loading and unloading—all developments of the last few years—will be refined and more generally used.

True accuracy in production first became significant with the advent of interchangeability of parts. It has continued to increase in importance until now the machine tool manufacturer must be certain that every single machine he produces is capable of meeting tolerances which would have seemed unattainable just a few years ago.

Today, there is a third factor that is far more important than any of the others—confidence . . . confidence in our national economy and confidence in ourselves.

Not many months ago a relatively mild form of economic hysteria set in, and we began to lose vitally needed confidence. Fortunately, our fears were not strong enough to overcome us. But if we had lost confidence, if we had suddenly decided to stop moving ahead, speed and accuracy and the thousands upon thousands of improved machines and techniques would have meant little.

Confidence should be easy for us in America. By 1975 we will have a population of about 190,000,000. Per capita income will have nearly doubled as will national income. About 850,000 more business enterprises will be in operation and the working force for the nation will be 88,600,000.

H. G. BIXBY
President, Ex-Cell-O Corp.
Detroit

"... automation can be applied to an operation or a plant by degrees"

Great strides have been made in automation in the last few years. Machine builders are taking steps to increase machine efficiency by slashing down time. Automation machines are designed so service or maintenance problems at one or two stations do not tie up the whole machine or whole production line. Arrangements are provided to by-pass stations that are temporarily out of service.

Automatic gaging and tool adjusting are being incorporated in the newer automation machines. Parts are gaged automatically after critical operation. As machining approaches minimum or maximum limits, the gages, through electrical circuits, adjust the tools or shut down the machine until adjustments can be made.

Consider the problem of short production runs (that's something with which machine tool builders are familiar because machines are built in small quantities). Automation is relative; it can be applied in any degree to one operation or to a complete plant. With these facts in mind, we are prepared to make recommendations considering all the factors that affect the machining of an individual part.

The selection of machine tools, whether simple or complex, cannot be made by any general rule. Every day our machinery engineering department recommends machines for volume production and reduced labor costs. Each workpiece must be considered individually in regard to size, shape, intricacy of form, accuracy specified and volume required.

Generally, low or moderate production can be done most economically with standard machines and simple tooling. As production requirements increase, it may be desirable to use equipment for automatic work handling. Still higher production requirements might require transfer or automation machines. Even special machines should be composed of standard components and assemblies where possible to minimize design and construction costs and to speed delivery.

FREDERICK W. RICHMOND
Chairman
Baker Bros. Inc., Toledo, O.

"... choice of write-off methods depends on circumstances; it's not automatic"

Before the enactment of the 1954 Internal Revenue Code, straight line depreciation was, for all practical purposes, the only method recognized by the tax authorities. The new law has given business the right to use the declining balance method, the sum-of-the-years' digits method or any other method of depreciation which will result in the depreciation of no more than 77 per cent of the cost of the property during the first two-thirds of its useful life.

If management of a business with excess working capital finds that new acquisitions for the year amount to less than 5 per cent of the company's total assets and that such acquisitions have a useful life of about five years, it might decide there is little to be gained from changing from the straight line method. If management determines that either tax rates or earnings will increase materially in two years, its decision might be to continue the use of straight line. The same conclusion might be reached if management could not afford to have the company's earnings minimized for financial statement or credit purposes.

If the new property has a useful life of ten or more years and the long-term economic advantages are of greater importance than immediate financial assistance, management might wisely elect to depreciate its new acquisitions under the sum-of-the-years' digits method. Beginning with the third year and until the end of the property's useful life, it outstrips all other depreciation methods, including the declining balance method.

Where immediate financial assistance is the chief consideration and the useful life of the property is less than ten years, the declining balance method should be selected. It provides the largest deduction for depreciation for the first two years. Another advantage is that a taxpayer may switch from it to straight line depreciation at any time without the consent of the commissioner of internal revenue. All other changes require the commissioner's prior approval.

HARBAGE L. ANDREWS
President, Jones & Lamson Machine Co., Springfield, Vt.

"... machine leasing will continue because need for it will remain"

The recent history of machine tool leasing has been most interesting. Leasing, as such, had been done in the machine tool field for many years on a minor scale.

The thing that has made machine tool leasing a hot topic during the last few years was not so much the substance of the idea as its revamping and aggressive promotion.

Unrealistic depreciation rates for capital equipment were a serious deterrent to machine tool replacement and plant modernization. Leasing plans were devised to help alleviate this problem. (Some of them, incidentally, created problems of their own.)

Leasing plans of many kinds are generally available. In form and provision, they have become somewhat standardized. Some companies offer plans tailored to fit the requirements of the customer.

Has leasing proved generally successful? Yes—for the simple reason that it fills a need in a way that is practicable and economically sound. It brings modern, high-speed, high-production equipment within the immediate reach of many companies. For any of a number of reasons, they could not otherwise acquire new machines within a short time.

Basically, one of the most attractive features of leasing is the fact that the machines, through their greater productivity, quickly pay for themselves.

Are leasing plans here to stay? Yes—in one form or another, because the need will continue.

Recent developments in management-labor relations make it perfectly plain that industry must face the issue squarely: Production efficiency *must* be improved; production costs *must* be trimmed; peaks and valleys *must* be leveled out to survive. The answer for industry is modern, high-efficiency machine tools.

GEORGE E. MERRYWEATHER
Chairman, Motch & Merryweather Machinery Co., Cleveland

"... simpler and faster handling will apply to the universal machine tool"

Trends in the machine tool industry are toward greater accuracy, higher production, lower product cost and better quality. Accuracy results not only from more precisely machined components but also from integration into the machine tool of cutting-tool failure controls, circuit failure controls, automatic gaging and evaluating mechanisms. The development of improved duplicating systems, such as the tape recording systems, and the refinement of hydraulic, electric and pneumatic duplicating systems also contribute to accuracy.

Higher production will result from more precise and heavier construction, permitting higher speeds and feeds and utilization of new developments in cutting tools, coupled with simplified and faster handling of the product. This will apply not only to the large, single-purpose installations but also to the universal, multipurpose and toolroom-type machines with simplified and readily accessible controls. Manufacturing costs will decrease because of their greater productivity and accuracy, with the resulting decrease in man-hours required to complete an item.

The greatest potential for savings and the most impressive developments will come in stamping, forming, extrusion, precision casting and not in chip-making tools. Products are being formed from strip stock with a minimum of scrap loss. They're being assembled in the press. Parts are cast or cold formed to limits that preclude all but the minimum of final finishing operations. Gears and splines are successfully cold formed by methods developed before World War I, but only made practical through the use of better quality materials available today.

G. B. ROBINSON
Chairman of the Board, Hydraulic Press Mfg. Co., Mount Gilead, O.

"... hydraulics will be emphasized"

The general outlook for the hydraulic industry is quite favorable. Private industry's capital expenditures for heavy equipment are expected to remain at a high level for the next two or three years. Our foreign policy dictates continued industrial support of all free nations with machine tools to enable them to increase their industrial output.

Beyond the immediate future lies the world of industrial automation, now in its infancy. We are convinced that the need for higher-production machine tools will place ever greater emphasis on hydraulics in the years ahead. Hydraulics is just coming into its own.

Costs, always a big factor in production planning, are increasingly important. We know that a great many plants are replacing old equipment with smaller, faster operating machines that eliminate lost motion and excessive man-hours in materials handling and in separate operations. Multiuse equipment helps reduce capital expenditures. Versatility of application is of prime importance in smaller plant selection of new equipment.

More and more automatic and semiautomatic operations are being employed.

GRAHAM E. MARX
Vice President & General Manager
G. A. Gray Co., Cincinnati

"... nonmachining time is biggest area for savings"

New machine tools are designed to cut production costs. New designs will have features that drastically reduce machine handling time, work setting time, tool setting time, as well as machining time.

We feel that nonmachining time presents the biggest single area for savings. Substantial reduction of machine down time or noncutting time can result in much larger savings to the buyer than additional increases in speeds and feeds.

The modern buyer of machine tools will be impressed by highly automatic machines with electric brains. He will also, however, be impressed by the simple, relatively inexpensive machines that will substantially cut costs on his work in his own plant.

New planer models, for example, will feature pendant stations that simplify control. Automatic tool lifters are standard. Power swiveling of the heads makes the operation safe and quick.

HOWARD N. MAYNARD
President, Snyder Tool & Engineering Co., Detroit

"... look for segmented automation"

Recent developments in transfer-type machine tools indicate that future designs will be built around the so-called segmented-type machine. In this machine tool, each operation is performed by individually controlled, self-contained machines, each having individual bases and control panels.

Automation between these individual machining units will be provided by transfer bar mechanisms for each unit. These transfer bars will be controlled by the individual units. Each unit can be loaded, unloaded and fed from stock banks while others are shut down for tool change or maintenance.

Segmented machines can be of lower initial cost because bases do not have to be machined, keywayed or bolted together. Cost allowances for obsolescence due to design changes can be reduced because the segmented concepts allow units to be added, removed or altered with relative ease.

Machine tool builders will be able to deliver segmented transfer machines quicker because machine tool design and building programs can be started before the parts are completely designed. Lower maintenance costs can be expected in these segmented transfer machines of the future.

J. P. CROSBY
Vice President Sales, Lapointe Machine Tool Co., Hudson, Mass.

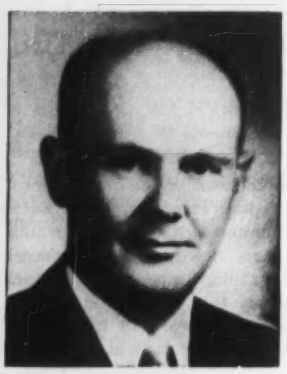
"... look for more electric broaching"

Today's production and precision requirements, and in most cases the skill of old-time craftsmen, are built into the machine tool.

Broaching machines produce parts at a speed of 300 fpm, where 20 years ago the average speed was 10 fpm. You can get finishes of minimum microinch in comparison to the rough finish obtained two decades ago. Precision tolerances are easily obtained on new broaching machines.

A distinct change in the driving force of broaches is taking place, and you will see in the future more broaching machines powered by electromotive force. The electric drive using a rack-and-pinion principle, gives a smooth, steady force that is necessary to maintain high tool life. The heavy, rigid construction of the broaching machine frame further improves tool life of the broach.

By using speeds up to 300 fpm, broaching of all newer alloys is possible. Development of better cutting tool steels or carbides is necessary to keep up with experiments going on.



RALPH J. KRAUT
President, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

"... export market is likely to improve"

During the last 38 years, an average of 20 per cent of the machine tool orders of American producers has come from abroad. In some years exports have run as high as 42 per cent. But for the last four the trend has been downward. The average of this period, for all reporting American producers, has dropped to 10 per cent. The primary reasons are the Korean-induced government restrictions on exports, dollar shortages in the world and, of course, the sizable price advantage enjoyed by foreign machine tools, as against those produced in America.

Despite the price differential, many overseas industrial concerns still show a marked preference for the generally more rugged, higher powered American designs. As economic conditions continue to improve throughout the world, particularly in Europe, industry must turn in ever increasing numbers to American machine tools if the U. S. is to compete favorably in world markets. As European economics expand, there is bound to be less divergence in prices of finished machines. Expanding economy on the Continent will also do much to ease the lack of trade dollars which has been a handicap to American export business.

Our own government has realized the seriousness of import quotas and other trade restrictions in vogue in many of our best foreign markets. Movements are under way, and well advanced, for conferences with 34 foreign countries. They will review and revise agreements on tariffs and trade in general.

LOUIS POLK
President, Sheffield Corp. Dayton, O.

"... practical vision is needed"

Never has it been more true that practical vision is indispensable to assure a continuous digestible rate of industrial growth.

A view of this progress discloses equipment utilizing new and improved techniques in machining. They are closely controlled by instruments which determine size and classification while simultaneously feeding back correctional information to command points to assure acceptable product quality, eliminate scrap and down time.

This approach, of course, will more quickly reach the ultimate in those industries which enjoy the highest multiple production. They can best afford and also secure the highest return on investment for those special-purpose characteristics which necessarily are a part of the first conception. The principles involved, however, often readily lend themselves to machine tools for the average production plant.

L. A. WILKIE
Chairman of the Board
DoAll Co., Des Plaines, Ill.

"... leasing has paid off for builder and user ... it's here to stay"

There are a number of advantages to the user in leasing equipment, but one of the most important appears to be that these plans make possible the installation and use of new equipment which would not otherwise be possible due to the lack of capital. Of possibly greater importance is that leasing permits the use of available capital in operational expansion.

From the machine tool builders' point of view, of course, outright sales are preferable. Next come sales on the installment plan. But leasing plans provide another selling tool.

More and more industries, aside from machine tool builders, have adopted leasing plans. They are tailored to conform to the needs and operation functions of each industry. While taxing authorities have liberalized depreciation rates, lease plans have been adopted with or without options to purchase, which are tied in with the advantages offered by the accelerated depreciation in new tax laws. Increased production with new machinery is the keynote in the use of leasing plans. A portion of capital goods will continue to be distributed under this method.

E. BLAKENEY GLEASON
President, Gleason Works
Rochester, N. Y.

"... low maintenance needs attention"

We are on the threshold of an era of ever-increasing industrial activity.

Manufacturers of capital goods must exert their best efforts to deliver equipment that will exemplify the highest order of quality and productivity.

As builders of intricately organized machinery, we have long recognized the continuous and pressing need for basic and original concepts to meet new situations. We also must improve methods and procedures once considered to be the ultimate.

Four phases of our activities are fundamental in our thinking. First, the improvement of product quality is a primary consideration. Second, our new machines have to be unbelievably faster than their predecessors. Third, automatic features such as complete cycling, loading arrangements, transfer mechanisms and removal of completed work, are necessary in today's designs where large volume is a factor. Fourth, careful attention is needed for producing machines which will require low maintenance for continuous operation.

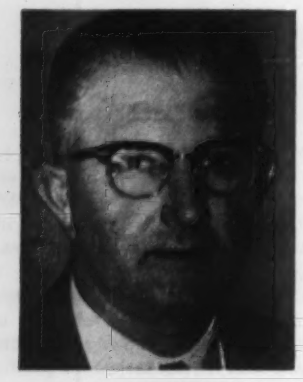
RALPH E. CROSS
Executive Vice President
Cross Co., Detroit

"... designers will put emphasis on the assembly machine"

Machine tool developments will be guided more and more by the characteristics of the end product. Instead of making machines that will do milling, drilling or turning operations, machine designers will be thinking of machines that will make subassemblies, assemblies or end products. The metalcutting units eventually will be integrated with master processing machines.

A few years ago machines were designed to perform specific metalcutting operations. The concept was changed, and machines were created to process complete parts. Labor, automatic inspection and minor assembly operations were added to provide subassemblies. In the future, the emphasis will be on the assembly machine, and many parts will be fabricated right at the point of application. For example, instead of making parts such as springs, washers and pins in separate factories, they will be fabricated, inspected and used as the assembly line demands. This will save much needless handling, sorting, inspection and transportation.

We are building a machine for assembling V-8 automobile engines. It is 560 ft long and has a capacity of 150 engines an hour.



ALAN C. MATTISON
President, Mattison Machine Works
Rockford, Ill.

"... look for heavier machines and higher horsepower"

Recent studies indicate the future for precision surface grinding is considerably broader than imagined. The future is contingent upon increasing production and lowering costs, which means building heavier machines for greater preci ion and providing higher horsepower to achieve desired production.

In the mass production industries, there is a continuing demand for integration of machining operations into materials handling systems and for control cycles which will fit the over-all production pattern. Even manufacturers with limited output require more flexibility, more accuracy, more productivity and want more operator conveniences built into the machine.

Today's machines are heavier and more rigid. They maintain precision for longer periods and reduce down time. These machines are easier to repair. An example of this can be found in the installation of the entire hydraulic circuit of a new grinding machine outside the machine casting.

Other developments which tend to improve operation and keep service requirements to a minimum include the use of instruments on machine tools. Ammeters are used to indicate the load on the motor. They tell the operator whether the wheel is cutting free.

Machine improvements have been accompanied by expanding knowledge of grinding technology. There has been a marked trend toward the interchange of technical information among abrasive manufacturers, manufacturers of machine tools and machine users.

Another tangible result is the closer specification of machines to job requirements. For example, a grinding school has been established to impart to dealers, production men and process engineers the latest developments in high-powered surface grinding.

W. C. DENISON JR.
President
Denison Engineering Co.
Columbus, O.

"... complexity will lead to the increasing use of hydraulics"

It was inevitable that economic pressure for greater production at lower cost would result in demand for machines and tools that could function automatically, requiring minimum manual control and attendance.

Presently, many machines are actuated by intricate mechanisms—gear trains, cams and levers, which become more and more complex as demands are made for additional automatic, low cost operations.

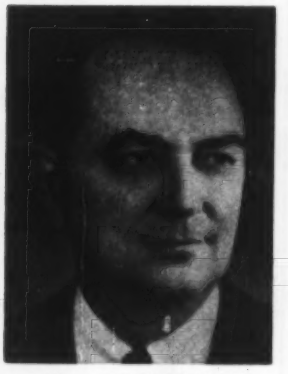
This complexity has and will continue to lead to the increased use of high-pressure hydraulics, long employed in the operation of presses, on all manner of machine tools.

Advances in design and manufacture of hydraulic components and circuits are making available to the machine tool builder, designer, plant engineer and tool engineer more accurate control and operation of automatic equipment than was formerly possible.

Widespread use of these products and high-pressure hydraulic operation in general are on the increase. Fluid power offers the machine tool builder and user many advantages, such as: Complex control with a relatively simple mechanism; an infinite variety of cutting speeds, accurately controlled and changeable during operation; rapid tool approach with slow cutting speed; rapid return of tool at the end of the working stroke; smooth, vibrationless action that is little affected by load variations; cushioning effect on tools which often results in an improved surface finish; great pressure where needed, either with or without motion; automatic release at overloads and automatic shutdown.

These features are inherent with properly designed systems, which also prove less costly because of greater simplicity, dependability and efficiency in operation.

The Multipress is an outstanding example of the application of fluid power to production equipment. All the advantages of hydraulics are incorporated to make this machine fast acting, efficient and dependable. It has a proved record on operations such as forming, broaching, stamping, flaring and many more.



M. A. HOLLENGREEN
President & Gen. Mgr., Landis Tool Co., Waynesboro, Pa.

"... new tax provisions will affect the replacement picture"

Today, machine tool users inevitably must consider: "How far should we go in replacing some of the obsolete machines in our plant with new models?"

Bear in mind that optional provisions on depreciation were written into the Internal Revenue Act of 1954.

Straight-line depreciation is no longer compulsory. Two options permit a faster write-off: 1. The double declining balance method, under which a company can write off about two-thirds of the original cost in the first half of a machine's tax life. 2. The sum of the digits method, under which a company can write off about three-fourths of the original cost in the first half of a machine's tax life.

The Internal Revenue Service has taken the position that in estimating the useful life (write-off period) of a machine tool, allowances may be made for normal obsolescence brought about by technological improvement or reasonably foreseeable economic changes. A quicker write-off than formerly may be allowed.

These factors have a vital bearing upon replacement arithmetic.

F. H. CHAPIN
President, National Acme Co. Cleveland

"... turning equipment will be more automatic, more powerful"

From the standpoint of metal turning equipment, tomorrow's machine tools will be the development of a two-fold trend already well established. Machines will be built to bring to more workpieces the time-saving, cost-reducing production advantages of fully automatic control of the machining cycle. Second, they must have the basic requirement of a machine design which will incorporate a greater potential in power and constructional rigidity than is dictated by current tooling practices.

The wisdom of this "greater potential than necessary" has been demonstrated over the years in our own operations. It is axiomatic that each new model must be designed not only to provide the margin of safety for the tools we know at the time but also to double this margin to secure the utmost in performance with tomorrow's tools.

The need for greater versatility in tooling and the adaptability for automation is ever present. Development of faster change-over is vitally important. The dividing line between standard and special machine tools has become less marked.

E. P. CUNNINGHAM
Vice President in Charge of Sales Clearing Machine Corp., Chicago

"... press feeding methods must be more versatile"

Because of attention given to increasing the productive speed of press equipment, many ways are available to accelerate the nonworking portions of the cycle. We have presses capable of cycling faster than feeding methods will permit.

One of the biggest challenges in the immediate future will be to develop more versatile automatic feeding methods. Transfer feed presses are playing an increasingly more important role here. They are enjoying success in the automation setups of big industry, but we must be able to supply the small manufacturer with automation. To do this, adjustable transfer mechanisms must be developed so a single press can handle a variety of stampings.

The automotive industry is specifying complete package units, with clean, straight-line frame design. All electrical and pneumatic controls and accessories are built in.

The Joint Industry Conference has done a great deal to set up industry-wide standards for press construction. They are aimed at greater interchangeability of dies from press to press.

JOEL BARLOW
Washington Council, NMTBA, AMTDA, Washington, D. C.

"... we're working with government for fair depreciation and procurement"

To insure continued modernization and readiness of the country's industrial plants for the expanding economy, the machine tool industry is working with the government in several areas.

The first is tax depreciation policy. In large part because of unrealistic tax depreciation policies of the thirties and forties, many companies were unable to provide adequate replacement reserves. They retained machine tools long past their maximum usefulness. More than half the machines now in service are obsolete. Resulting high-cost production raises another barrier to effective competition with foreign manufacturers for the world's markets.

The machine tool industry has advocated fairer and more reasonable tax depreciation legislation and administrative policy. Substantial progress is just now being made. In particular, the Internal Revenue Code of 1954 provides more realistic depreciation allowances through the sum-of-the-years digits and the double declining balance methods.

Recognizing the vital role engineering and development have played in the progress of the machine tool industry and all the industries it serves, the industry has repeatedly urged liberalized tax deductions for engineering and development expense. The 1954 Internal Revenue Code now provides such deductions.

In the area of Government procurement, the machine tool industry is advocating policies which will enable the Government and its contractors to purchase machine tools best suited for the particular job, with assurance that new attachments and parts will be available in time of national emergency. It is participating in planning mobilization programs designed to insure against a repetition of the machine tool shortages which bottlenecked production at the beginning of World War II and Korean emergency. It is assisting in the establishment of machine tool reserves which will be available to the metalworking industries in any new emergency. It is working with the Government on programs designed to make maximum use, throughout both defense and defense-supporting industries, of the advances in machine tool technology.

FREDERICK S. BLACKALL JR.
President & Treasurer, Taft-Peirce Mfg. Co., Woonsocket, R. I.

"... free convertibility of currency will ease machine tool export pains"

The Conservative victory in the British general elections considerably brightens the prospect for some early return to the free convertibility of currency. When this comes about, the opportunities for export of U.S. machine tools should be vastly strengthened.

The dollar shortage has long been blamed for the reluctance or inability of Europeans to buy American products. There has been some basis for this contention, too, but, today, the dollar shortage has largely vanished. The only remaining barriers to the purchase of U.S. machine tools and other products are an unwillingness of foreign nations to make the dollars available to their nationals (which will come about within the sterling areas when convertibility is established), embargoes and quotas, some of which are still imposed by foreign nations and, of course, the natural forces of competition. Competition-wise, it must be recognized that we are still facing a formidable barrier, since European machine prices are far below our own, and will probably continue to be, so long as European wage rates are about one-third of ours.

Our problem is one of making our machines more productive and in other respects more desirable to the European user. Many U.S. machine tools are still far ahead of the European competition in these characteristics, but we must keep on our toes. The competitive race is a vigorous one, and the European machine tool industry is reaching new peaks of output. Their designs are vastly superior to those of the typical prewar product.

Nevertheless, the removal of currency restrictions and other artificial obstacles to the shipment of U.S. machine tools oveseas, which should come about within the reasonably near future, offers some hope for a return of the U.S. export trade in machine tools to something akin to its former position of importance.

FRANCIS J. TRECKER
President, Kearney & Trecker Corp.
Milwaukee

"... leasing is close to phenomenal"

Eighteen months ago we announced a broad program for leasing machine tool products. Results have been little short of phenomenal. Lease agreements in excess of several million dollars and outright sales of several million more are directly traceable to the promotion. This, we think, is the strongest evidence that leasing is here to stay.

Careful analysis of lease agreements discloses large and small manufacturers have taken advantage of our program for several reasons, including: 1. To make working capital available for other purposes. 2. To expand production. 3. To maintain high standards of efficiency and capacity without incurring capital costs. 4. To allow a considerably wider choice of production procedures to meet changing conditions.

Leasing has assured the user of the services of a machine as long as he needs it without committing him to its total life. In many cases it has proved the salemen's story about the greater productivity of modern machinery. Where the prospect showed skepticism, he was willing to be shown so long as he could lease rather than buy outright.

G. M. STICKELL
Vice President & General Manager
Landis Machine Co.
Waynesboro, Pa.

"... many industries, including ours, cannot justify cost of automation"

On first thought, it would appear that one of the most far-reaching effects of the Guaranteed Annual Wage, from the viewpoint of management, would be the powerful incentive to obtain maximum efficiency from a minimum labor force—an objective most easily and quickly obtained by automation.

It soon becomes apparent, however, that there are many industries, including the machine tool industry, which cannot justify the cost of automating their own operations.

With or without GAW, production industries have found in automation the one solution to cost control. Because these industries absorb the majority of machine tool production, there can be no question but that the trend to more highly specialized, more fully automatic machine tools will have to continue.

The real danger is the possibility of the machine tool builder overlooking the needs of a substantial segment of the metalworking industry—the need of better general-purpose machine tools.

If GAW, or its substitute, Supplemental Unemployment Payments, spreads throughout industry, the salvation of those metalworking plants outside the high production industries will lie either in diversifying their products to level off the peaks and valleys of sales or in getting a more flexible workforce and a more flexible physical plant.

HENRY D. SHARPE JR.
President, Brown & Sharpe Mfg. Co., Providence, R. I.

"... finest designs reflect attempt of builder to answer customers' needs"

The number of machine tools that you will be able to see in the immediate future will be bewildering.

There will be a siege of claims and counterclaims among competing builders, and all of us will have a difficult time keeping a stable eye on the fellow who is really building excellent equipment.

My own feeling is that the finest designs are the ones that reflect a canny attempt by the tool builder to answer his customers' needs.

Adding features to keep pace with the competitive Joneses rarely answers the problem.

Look at any machine tool with this fundamental in mind, and it's not difficult to separate the men from the boys.

G. C. MARAKAS
Sales Manager
American Steel Foundries, Cincinnati

"... simplicity of design is a must"

It is evident from the information we obtain in our day-to-day dealings with the metalworking industry that there is an ever-growing demand on machine tools for higher productivity and higher quality.

Automatic cycling devices, automatic duplicating mechanisms and similar control features are becoming standards. In some industries this type equipment is no longer merely advantageous to have. It is a necessity to meet design and production requirements.

Improvements in cutting methods have brought about a demand for increased horsepower. Speed and feed requirements are constantly progressing beyond the point where they have been available.

Simplicity of design must not be overlooked. Industry's operating and maintenance personnel must be able to quickly and easily understand their equipment to use and service it effectively.

E. C. BULLARD
President, Bullard Co.
Bridgeport, Conn.

"... the answer is productivity"

The continuing rise in operating costs and the probability of continued high tax rates pose a problem for industry. The only answer is increased productivity. Those who obtain increased production while improving product quality, will be the survivors in the highly competitive markets of today and tomorrow.

Spectacular fully automatic transfer machines in the mass production industries have received much well merited publicity. Such devices are not applicable to the major part of the metalworking industry. It is here that the builder of multiple-use, standard machine tools can make the greatest contribution.

Machine tools, to maintain accuracy with better finishes and closer tolerances at higher speeds and feeds, will require not only more rigid construction but must provide a means to supplement the skill of the operator. Centralized control will reduce greatly operator time. Ease of operation will reduce operator fatigue and improve morale which contributes so much to pride of workmanship.

To meet the constant demand for greater productivity, machine tools will provide automatic loading and unloading, automatic positioning of work and automatic gaging of machined surfaces with means to stop the machine automatically if finish or dimensions exceed tolerances.

Fully automatic machine tools, which can be readily changed over for a variety of relatively short production runs, will be another factor in the race for increased productivity.

JOHN F. HERKENHOFF
President & Treasurer
Minster Machine Co., Minster, O.

"... customers want flexibility"

An important trend in the metal forming industry concerns presses that are complete with all auxiliary equipment. The equipment is built into the press so that it's a matter of connecting power leads or air lines to place the press into operation in the user's plant. All auxiliary equipment, although well concealed, is still easily accessible.

Further press improvements give increased performance and machine life. The improvements include higher recognized standards of accuracy, better materials, automatic lubrication and more operator convenience.

Our industry also is emphasizing increased single-stroke tripping capacities and improved electrical and pneumatic controls.

The demand on our customers for the manufacture of constantly improved and changing products places a responsibility on us to retain a flexibility in press designs.

DAVID C. VERSON
President
Verson Allsteel Press Co., Chicago

"... expect new interest in extrusion"

In the not-too-distant future, we will experience an upsurge of interest in cold and hot extrusion. Work in the last few years has been primarily experimental, but within the last few months, several processes have been proved and are going into production. Primarily, the machines involved are of standard design and are made suitable for high-production extrusion work by automated tooling and feeding devices.

A logical forward step, based on developments, would indicate that larger and larger parts will be extruded in both ferrous and nonferrous metals at large savings to the manufacturer.

It also can be expected that the current boom in automation equipment will continue, that new fields will be entered. Partial automation conceivably can offer greater long term advantages to builders and users than now seem apparent.

The future looks bright and promising. Barring unforeseen developments, the machine tool industry and the country can look forward to even greater prosperity.

H. B. NEWTON
President, Rockford Machine Tool Co., Rockford, Ill.

"... behind automation, standard tools"

One could easily conclude from the publicity given automation, processing machines and other special high-speed metalcutting and forming machinery, that the standard machine tool (the engine lathe, the shaper, the milling machine) is "dead as a dodo." Nothing could be further from the truth.

While automation and mass-producing metalworking machinery certainly are the more glamorous aspects of the machine tool industry today, a closer study of the problem will show that behind all of the glitter of this equipment remains the bulwark of the standard machine tool.

Check into the most intricate piece of automated equipment and you will find that it was produced by its manufacturer on the same standard engine lathes, milling machines, shapers, etc., that have provided the backbone of our industrial development since the early days of our history. The standard machine tool has more than kept pace with its glamorous automated offspring. It is the improvement in the standard machine tool, its higher cutting speeds, its adaptation to carbides, its greater operator convenience, that make it possible to produce automated equipment at a reasonable price and in a short enough time to justify its use.

No matter how specialized our machinery becomes, no matter how automated our mass-production industries become, the standard machine tool will still be around for a long time.

SWAN E. BERGSTROM
Vice President, Cincinnati Milling Machine Co., Cincinnati

"... the incentive is for replacement"

Never before has metalworking had such opportunities for cost savings.

No user of metalworking equipment can afford today to operate his plant with obsolete machines. The fact that his equipment is paid for and written off, as far as his capital account is concerned, does not necessarily make his plant an efficient one. Any machine tool that can be replaced by a more efficient one that will produce a product at lower cost, is obsolete, whether is is 1 or 20 years old.

Our recent change in the Internal Revenue law providing new depreciation allowances indicate that the government recognizes the need for modernizing our metalworking industry. By allowing a choice of depreciation allowances, the law gives the users of machine tools the incentive to replace their old, obsolete equipment.

This incentive, plus the incentive of cost reduction, should prompt every user of machine tools to carefully check benefits that can be obtained from them.

H. W. BOCKHOFF
President, National Automatic Tool Co. Inc
Richmond, Ind.

"... less down time seems to be the order of the day"

In the last few years production has been increased as much as 50 per cent. Greater accuracy is obtained and less down time seems to be the order of the day.

One new machine taps 120 pieces a minute. It turns out 7200 pieces an hour, each piece containing 15 tapped holes. This means that 108,000 holes are tapped in 1 hour on this machine. The whole operation is run by one man. Tap life, incidentally, was jumped 50 per cent on this job.

This kind of production operation is the answer to today's high costs. The operations being done on this machine are all tapping. The machine has 14 tapping heads. Workpieces are small telephone components.

The machine is hand fed. Parts move into the work station and on out the other side. The high number of reversals proved to be the problem. We solved it with hydraulics.

ARVID O. LUNDELL
President, Colonial Broach & Machine Co., Detroit

"... look for mechanical broaching"

A trend in broaching machines that will be worth watching is the increasing use of modern mechanical machines. While new hydraulic machines are being and will continue to be designed, mechanical broaching machines offer advantages in cost and performance for many jobs.

Variable speed drives permit considerable latitude in ram speeds on these machines, so the particular job is broached at the ideal cutting speed for the material being machined. High ram speeds, where practical, also are a major advantage, since they permit the use of carbides in many broaching operations with a resultant increase in machining efficiency and minimum tool pickup.

Extremely interesting possibilities are offered by some of these mechanical machines. One is a vertical surface broaching machine that carries the broaches on an endless chain, permitting an unusually compact machine with minimum ceiling height, to deliver an extremely long cutting stroke.

To this obvious advantage is added the feature of flexibility. Many applications permit continuous operation, with indexing taking place between cutting stations on the broach carriers.

MARVIN R. ANDERSON
Executive Vice President
Michigan Tool Co., Detroit

"... gear production will be automatic"

Cold forming of toothed parts, automatic handling of work in process and complete control of gearmaking equipment along every step of the manufacturing process loom equally important on the horizon.

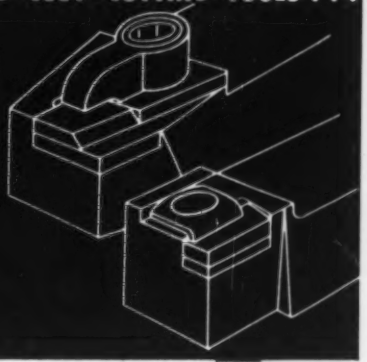
Automatic control of gear cutting and gear shaving machinery, coupled with 100 per cent inspection of finished parts, holds great promise for a large number of gear producers. The "3-way" classifier, for example, can be used either in an integrated production line or to inspect the output of one or more gear shapers, hobbers or shavers in conventional production operations. When coupled with a control panel, one of these units can be used to maintain correct center distances, compensate for tool wear, etc., preventing the production of off-limit gears.

The completely automatic gear production line—from blank to finished gear—represents the ultimate in modern gear production when volume is large enough to make such an installation practical.

Cold forming of toothed parts, too, has a future. The first installations have been in production long enough to show the advantages of the process in regard to high production, extreme accuracy of formed parts and long tool life. The results impress all who have seen the process in action.

LIKE ENGINEERED COST-CUTTING TOOLS . . . . . .

which permit speeds and feeds that would burn up yesterday's best, yet seem to run on and on with little sign of wear . .



CMP *cold rolled strip steel...*

CAN HELP YOU SAVE TIME AND CUT TOOL COSTS

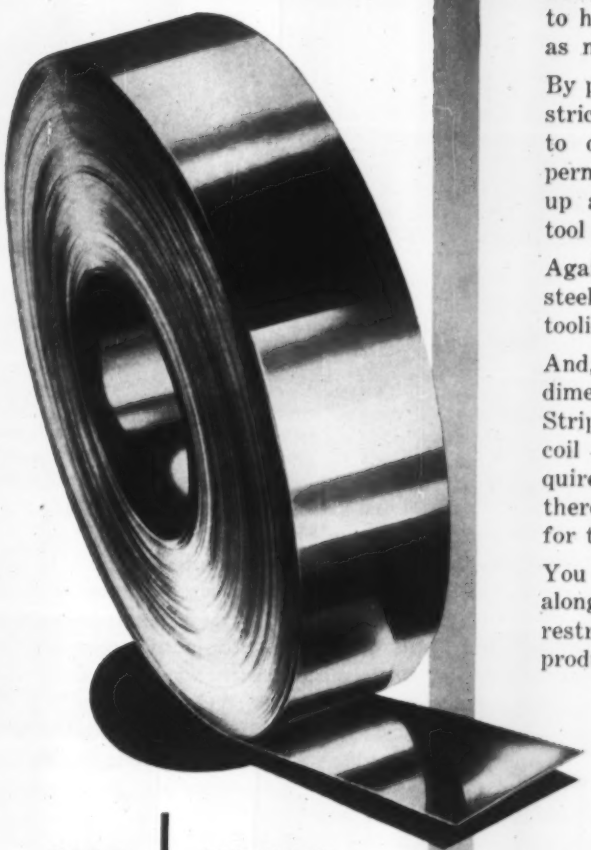
Frequently, CMP can do as much and more to help you save time and cut tool costs as modern tools themselves.

By processing cold rolled strip steel to restricted specifications, it often is possible to develop working qualities that will permit forming operations to be speeded up as much as 25% without increased tool wear.

Again, qualities may be imparted to the steel which will permit simplification of tooling, and even elimination of operations.

And, always, because of the customary dimensional precision of CMP Cold Rolled Strip Steel, there is more footage per coil . . . fewer coil replacements are required on automatic-feed operations . . . there is less tool wear . . . fewer stops for tool changes and assembly is speeded.

You are invited to use CMP's experience along this line with a view to developing restricted specifications to cut your end-product cost.



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WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

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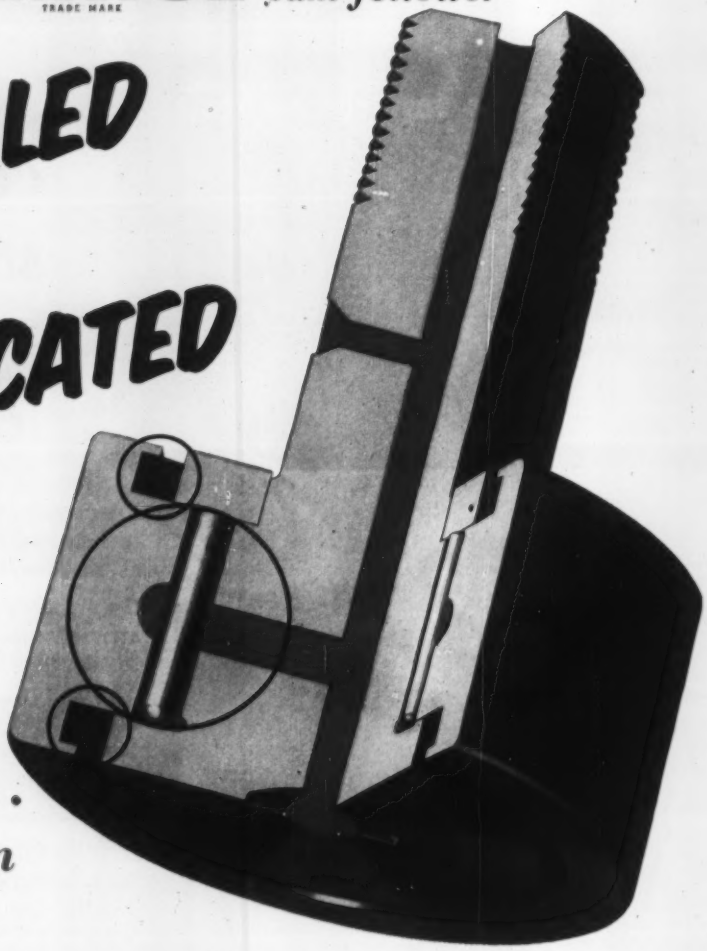


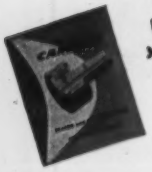
to eliminate contamination . . . save re-lubrication

McGILL®

SCF series

CAMROL TRADE MARK

bearings



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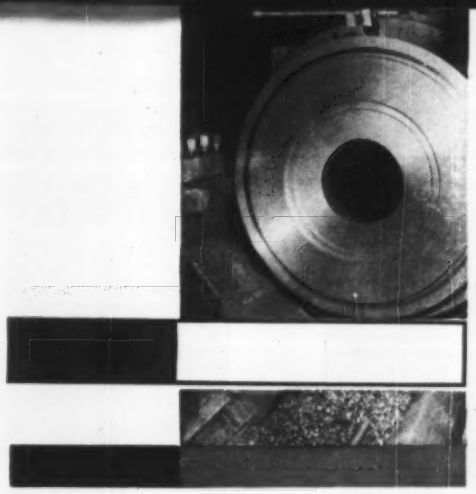
In one simple assembly, the Sealed CAMROL cam follower bearing gives you three big advantages: 1. capacity to withstand the shock and load of cam action, 2. sealing against contamination that would impair the life of an unprotected bearing, 3. prelubrication that saves frequent relubrication so often undesirable in cam action application. Specially treated seals are built in at stud and flange ends, and a black oxide finish offers outside corrosion resistance. A channeled reservoir in the outer raceway bore helps store reserve lubrication sufficient in many cases for lifetime service. The new SCF series bearings do not add to the size or weight of standard CAMROL cam followers and are dimensionally interchangeable with them. Ask your McGill representative to show you this newest McGill contribution to the superior performance of your cam actioned machinery, or write to our engineering department for recommendations. Send for Bulletin SCF-55 for more detailed information.

Insure performance with McGILL®. . .

50th Anniversary

MULTIROL®—GUIDEROL®—**CAMROL** *full type roller bearings*

McGILL MANUFACTURING COMPANY, 301 N. Lafayette Street, Valparaiso, Indiana



The Users' Viewpoints

Over the long pull, it's the machine tool user and his needs that determine machine design and development. With this in mind, STEEL asked a group of top production men to tell what future developments or improvements would be most important to them in their own jobs. Here are their answers

"... want reliability and accessibility"

We are trending toward more automation. Since our products are to a great degree short run and custom built, our operation is a wide modification from the many-station transfer machines which are becoming typical of the mass production industries. So far, we are using machines which work during the loading and unloading cycle, such as conventional semiautomatic chucking and automatic bar machines.

We also have specialized machines of the same general character which are made to do special operations peculiar to our product. These machines usually are a rotating table with a loading station, and as many work stations as are practical and necessary.

In connection with this trend, the features on new machine tools which interest us most are reliability and accessibility for quick maintenance. The more we combine operations, the more we suffer when a machine or tool fails. We are looking for extra beef and rugged construction.

R. W. CORNELL
Vice President-Manufacturing
Parker Appliance Co., Cleveland

"... improved chucking mechanisms"

Automatic screw machines should be equipped with better bearings and spindles to accommodate higher spindle speeds necessary for the improved free-machining materials.

Automatic screw machine chucking mechanisms should be improved to permit faster cycling time and higher spindle speeds. One suggestion is to use carbide inserts in the shoes.

Better clutches should be perfected. This would be a big step in the reduction of costly down time.

Machine tool builders produce excellent machines, many are slow in developing attachments to permit more operations.

Machine tool builders still have a long way to go to solve the problem of being able to use soluble oils on various machine tools without having it mix with lubricating oils. Better sealing still has to be developed.

Automatic screw machine parts, such as gears and cams, should be made interchangeable within the various size machines in a manufacturer's line. Easy removal of chips is another requirement.

RALPH BRAID
Supt., Automatic Screw Machines
Harvey Machine Co.
Torrance, Calif.

F. V. LEONE
Plant Manager
Rheem Mfg. Co., Chicago

"... we would like safety in the design"

Three basic points may be considered typical of the trends and performance we would welcome from manufacturers of machine tools and equipment:

1. We would like to see safety engineered into the design of equipment instead of being added after it arrives in our plant. If such engineering were added, it would result in less interference with operation.

2. On specification of equipment, we would like to have the continued benefit of more of the machine tool builders' specialized knowledge. While we are able to do a complete job of engineering on equipment built for us, there are often points on which the suppliers' technical knowledge and experience has been a valuable asset.

3. In practically all equipment we are buying, it would be valuable for the machine tool industry to remember that mechanization and automation are the goals of manufacturing. While we do not expect to realize these goals overnight, we would like to know that new equipment being delivered in the months ahead could fit into our operations as we arrive at more efficient manufacturing.

CHARLES E. MOORE
Works Manager, Yale & Towne Mfg. Co., Philadelphia

"... the most desirable trend ... would be unit subassembly"

In our materials handling equipment manufacturing plant we change jobs on an average of once every 4 hours on every machine to turn out 65,000 different parts.

Because of this method of operation, we feel that the most desirable trend in the future design of machine tools would be toward unit subassembly construction.

Given this in our plant we would benefit from the realization of: Lowered capital cost in creating single-purpose tools for higher production by using building block construction when complete transfer machines are not required, continued operation on critical production parts in the event of breakdown of one of the units, maximum advantage of programmed maintenance, repair and replacement and greater versatility in adapting general-purpose machine tools for specific parts.

In addition to this basic design advance in the machine tool industry, there are several other improvements we would like to see in the future development of machine tools.

Setup procedures should be shortened by dial-type electronic control for speed, feed and stroke. Greater rigidity is needed to satisfy recent developments in perishable tools.

HAROLD R. FOSS
Director-Manufacturing Engineering
Ford Motor Co., Dearborn, Mich.

"... machines used like building blocks"

The following points should be governing considerations in the machinery builders' designs and in our purchases of future machine tools: Productivity, flexibility, low operating and maintenance costs and initial cost.

Parts in large quantities can be produced at the lowest possible cost in a sequence of operations where the workpiece is moved from station to station by mechanical means. Most of this expensive and complex equipment, although it produces parts at high production rates, lacks the necessary flexibility to permit rapid adaptation of changes in product design.

To provide flexibility and reduce the problem of obsolescence, we anticipate the development of "unitized" machine tools. These machines will be capable of being used like building blocks to meet particular operational requirements of the product.

As the product changes, new units may be added to the machine, or they may be removed or rearranged to provide the most efficient operational sequence.

Rotary Embossing a Bright Idea

For Strip or Sheet Metals

MEMCO

MASTER Hydraulic Embossing Machines

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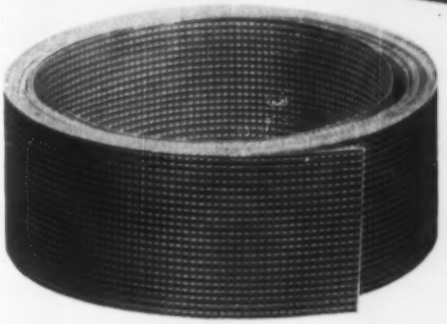
Rotary embossing with MEMCO Hydraulic Machines and *matched* flame hardened steel rolls gives your product a *deluxe appearance*—at a cost figured in fractions! Whether you use "localized" embossing or all-over patterns, this bright idea for metals adds the *product punch* that sells. Or it may prove to be an important *cost-saver* . . . in materials . . . in man-hours. Designs can be simpler, construction cheaper, when you use embossed metal for decorative styling, trim, nameplate or other "finishing touch."

And MEMCO's *modern*, high *speed*, high *precision* methods and equipment—using exclusive flame hardened rolls for maximum life—end down time and bottlenecks, accelerate your production. Use rotary embossing on your present products . . . *design it in* on future models. Consult MEMCO for *all* the facts on this bright idea in metal!



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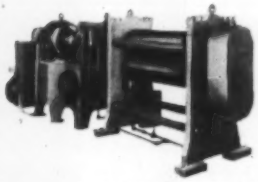

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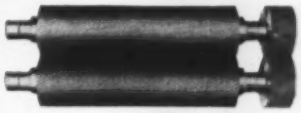
High speeds—50 to 500 feet per minute! Precision finger-tip control for easy operation. Embosses in sheet, coil or strip on all metals. Available in 5, 10, 20, 50, 100 and 175 ton models.



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Precision matched rolls of forged steel to emboss the most complex patterns and textures on one or both sides of any metal. Flame hardening insures utmost durability.

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Gentlemen: Please send me all available literature and complete details on rotary embossing with MEMCO equipment.

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(Advertisement)

Exhibit No. 1414

Bliss unveils four new lines of metal working presses

Many innovations in auxiliary equipment to be revealed for the first time

Visitors to the Machine Tool Show in Chicago will be able to witness operation of newly-designed inclinable, straightside, knuckle joint and high production presses—each representative of complete new press lines by Bliss.

In addition to the four new press lines, Bliss will also exhibit such important new developments in auxiliary equipment as its new Automation Control Switch, a new combination air friction clutch and brake, new feed mechanisms, and a host of other up-to-the-moment designs.

What promises to be an outstanding attraction of the Bliss exhibit, however, will be its premiere showing of four new color and sound movies on the subjects of press maintenance, automotive and appliance industry uses of Bliss-designed transfer feed presses, and on the Bliss-Crary Tonnage Limitor—a new and unusual "overload" device.

For those who intend to visit the Show, the contents of the Bliss exhibit are briefly described here with the hope that it will help them decide what they would particularly like to see, and thus help them make the most of their limited time. For those unable to attend, full particulars on all described here are available on request.

New line of enclosed inclinables with air friction clutches . . . A complete new line, ranging from 75 to 200 tons, will be represented at the Show by a 75-ton model. These are extra-heavy presses: frames are totally-enclosed and they have box-type crowns. All electrical, air and lubrication controls are housed within flush-fitted panels in the frame. Other features include: air friction clutches, motorized slide adjustments and inclining mechanisms, automatic return oil lubrication, bronze liners in the slide, heavy wrist-type connections, and extra-long gibbing. All die space dimensions and controls conform to JIC standards.

Streamlined, enclosed coining press has new wedge-type adjustment . . . Bliss' new line of coining presses will be represented at the Show by a 400-ton model which will be set up to strike souvenir Bliss medallions. Most outstanding feature of the press is its new motorized wedge-type adjustment which eliminates the need for a separate top lock device and compression springs. The new press is streamlined in appearance, and its controls are neatly housed in semi-flush panels. Two independent lubrication systems are now utilized in Bliss coining presses—one to circulate cascade type lubrication to the knuckles and the other for remainder of the press bearings.

MACHINE TOOL USERS

new ideas highlighted in —

PREMIERE SHOWING OF FOUR MOVIES FOR PRESS USERS

These movies will be run in the Bliss exhibit on an around-the-clock basis. A movie "time-clock" will tell you when the one you want to see will begin. After the Show, all movies will be available upon request for showing to your own personnel.

Power Press Maintenance . . . The picture was developed for instruction of personnel responsible for the upkeep of presses. It shows correct procedures for set-up of new Bliss straightside and inclinable presses . . . describes proper lubrication, inspection and maintenance methods; tells how to check and adjust slide alignment, how to adjust ball joints . . . bearing clearances . . . clutches . . . and also describes free counsel available through Bliss' new Preventive Maintenance Program.

Bliss' 1000th transfer feed press . . . Viewers see how this 250-ton transfer feed press performs 11 separate operations on 5" steel blanks and produces finished auto starter brush end plates — all automatically. The dial feed, the dies required in each of the 11 stations, and the electrical interlocks that protect the press against misfeeds are all carefully explained.

Transfer feed presses in the appliance industry . . . Shows how a large appliance manufacturer uses a 700-ton Bliss transfer feed press to turn out refrigerator shelves and crisper pans from coil stock. Shows every step from the coil through the series of dies to the finished pans. The transfer feed mechanism alone makes it well worth the watching.

The Bliss-Crary tonnage Limitor . . . This movie explains a new device designed to protect presses from overloads at every point of the stroke. It reveals that, unlike earlier devices, the Limitor adjusts itself automatically to changing press capacity characteristics at different parts of the press cycle. How it's done is explained in the film in detail.

High production press has new feed, new lube system . . . A new Bliss 60-ton H-P press, capable of making more than 450 stampings per minute, represents the new line at the Show. The feeds have been redesigned and now incorporate a new rack and pinion feed drive, an anti-friction overunning feed clutch, and a newly-designed scrap shear. Another change has been in the press legs. In its left leg have been housed its air controls, and in the right is the "heart" of a completely new return oil lubrication system — a large oil reservoir, filters and pump. Controls have been removed from the press and mounted instead on a pedestal base.

"Packaged" straightside presses: controls, piping and wiring part of the package . . . The 250-ton straightside two-point press exhibited at the show, "baby" of the line, is typical of six new lines of "packaged" presses designed by E. W. Bliss Company to aid the stamping industry in its swing towards automated production. Presses in the line, two of which are "under-drives", embody JIC specifications; are shipped ready to be installed. About all that needs to be done is plug in air and electrical lines. Putting all pipes, wires and controls in uprights leaves clean, uncluttered exterior, and speeds maintenance. Other features include automatic recirculating oil systems, motorized plunger and blankholder adjustments, and high speed air or electric clutches—*and* Bliss' new Automation Control Switch for doper, kickers, lifters, Iron Hands and the like.

In addition . . . Bliss will take the wraps off its new Automation Switch, a new electro-mechanical nine-station rotary limit switch whose major advantage is the fact that despite its simplicity of adjustment and operation, it is accurate within less than *one degree*.

Also shown will be the details of Bliss' new crankshaft mounted combination air friction clutch and brake . . . new developments in die sets and die springs . . . new feeds and feed components . . . and a host of other developments, many of which may be of immediate and pressing interest to you. You're cordially invited to drop by the Bliss Exhibit, No. 1414, and see the latest developments in the pressed metal industry.

BLISS
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is more than a name... it's a guarantee!

E. W. BLISS COMPANY, Canton, Ohio

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

SUPER-PRECISION

JOHN A. MATOUSEK
Vice President
Baker-Raulang Co., Cleveland

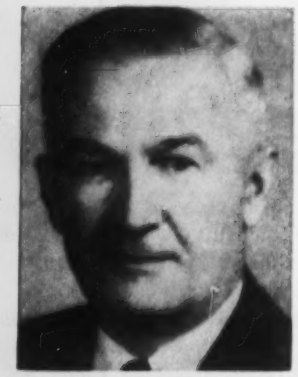
"... what we need are machines that can be set up rapidly and accurately"

As a manufacturer of industrial fork lift trucks and other materials handling equipment, we are faced with the problem of job-lot manufacture. Only rarely are we able to produce as many as 100 vehicles of the same kind in a 30-to-60 day period.

We use general-purpose machine tools. Because the runs are short, setup time is often in excess of actual productive requirements. What we need are machine tools that can be set up rapidly and accurately. For example, in some of our jobs, we require 4 to 6 hours of setup, while productive requirements for the parts order may be 2 hours.

Higher speeds and the use of carbides and other new cutting tools would not make a great deal of difference. Furthermore, automation would not seem to be the answer unless it is applied to a specific machine and is so flexible that we can switch from part to part easily.

If variables, such as backlash could be minimized, and if the tools were equipped with mechanical measuring devices which would indicate absolutely accurate settings, we could cut adjustment and trial-cut time.



CLARENCE G. ROSENSWEIG
Executive Vice President, Fafnir Bearing Co., New Britain, Conn.

"... we are interested in flexibility"

We are pursuing a long-standing policy of diversification.

Diversification and large variety mean shorter runs and more frequent change-overs. At the same time, demand is growing for specialized bearings for new and exacting applications. Consequently, we are extremely interested in equipment with maximum flexibility to minimize setup time.

The price factor confronting us cannot be emphasized too strongly. Every possible avenue should be explored to reduce the cost of basic machines.

Breaking in, experimenting with and adjusting new equipment has been a costly and time-consuming process in our experience. This applies to both manufacturer and buyer. The parties would benefit mutually if the breaking in and shakedown process were carried to a more advanced stage by the manufacturer before shipment.

More automatic machinery, particularly as applied to grinding, presents an opportunity for significant improvement in production methods.

R. F. LAUGHNA
General Manufacturing Manager
Studebaker-Packard Corp., Detroit

"... demand increases for automatic size control and finish instruments"

With the increased demand for automation, increased competitiveness of industry in general and emphasis on control of machine and tool costs, it is reasonable to assume that machinery advances and improvements will continue at a fast pace.

There will be an increasing demand for greater machinery specialization and interchangeability. While these appear as opposite goals, machinery can be made one-purpose and flexible through the development of multiple interchangeable units.

Future machines must provide greater rigidity to obtain closer tolerances and accuracy when cutting speeds and feeds are increased. There will continue to be a demand for improvements in automatic loading and unloading mechanisms, devices for chip breaking and chip clearing, overload protective mechanisms and lubricating systems.

Emphasis will be placed on the quality productivity of machinery, with increased demand for automatic size control and surface finish instruments.

The future will see a continuation of the trend toward compactness of machinery, with design emphasis placed on readily accessible repair and service.

new SUPER-PRECISION BORING MACHINE

designed and built by **POPE**

See it in action at the MACHINE TOOL SHOW Booth 117

No. 10

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Electrically controlled table provides infinitely variable feed and traverse all in one separate cabinet.

— no cams, no change gears, no sprockets, no linkages.

Automatic operating cycle includes timed loading period when desired.

Forty-five degree angle table and bridge for rapid loading and unloading — free flow of coolant and chips.

For super-precision boring and the continuous production of accurate parts —

For the very latest design in simplicity and versatility —

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TUNGSTEN—HIGH SPEED
Silver Steel blades for cutting hard, extra rough steels and highly abrasive materials.

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Silver Steel blades for general purpose cutting of all metals.

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Silver Steel blades that are shatterproof for top production and extra life in general purpose cutting.

THE ATKINS LINE ALSO INCLUDES:

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YOU CAN DEPEND ON YOUR INDUSTRIAL DISTRIBUTOR

R. A. HOWICK
Chief Indust. Engr., Distribution Equipment Div., Square D. Co. Detroit

"... automation is a tool ... labor saving equipment will continue to expand"

Automation is just another tool (and not even a new one) of the industrial engineer in his quest for increased productivity. Its effect, proportionally, probably will be no greater than the effect of other industrial engineering tools—work standards, work simplification, incentives, etc.

There is no reason to suppose that progressive companies having the will and the capital to buy all available labor saving equipment, will not continue to create employment just as they have in the past.

Fifty years ago, this company had a handful of employees. Since then, it has been buying every imaginable type of labor saving equipment. Theoretically, this should have reduced the work force, but, today, we have thousands of employees.

Automation's impact, the same as it was for other cost reduction tools, puts greater pressure upon management. A particularly excellent automation job done by a competitor could wipe out an unwary company's markets.

PAUL W. RHAME
Gen. Mgr., New Departure Div. General Motors Corp., Bristol, Conn.

"... simplified special machines, automatic gages, preset tools are musts"

How can the machine tool industry best serve our needs for the future? As I analyze this question there comes to mind the need for many improvements in the design and development of machines for use in the manufacture of ball bearings. Some of these needs, each of which is of paramount importance, are:

1. Simplification of specialized production machines, thus permitting lower costs. Machines of this type would assure greater accuracy, require less space, reduce maintenance, result in trouble-free operation.

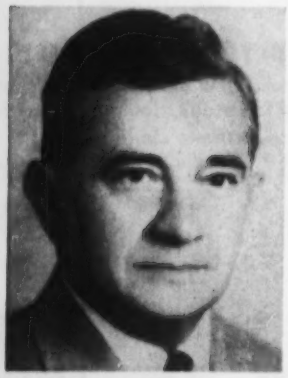
2. Development of automatic gages for parts in process, assuring their dimensional accuracy before they leave machines.

3. Inclusion of necessary feedback mechanisms that would assure proper adjustment of machines, resulting in improved product quality.

4. Design and development of machines with preset tooling, the beneficial factors here being the reduction of down time and greater utilization of equipment.

5. Equipment designed to permit rapid transition from one particular production item to another, drastically reducing setup time involved.

6. Development of equipment which can be automatically loaded and which will automatically eject parts, eliminating manual loading and handling, with resultant improved production efficiency, lower product cost.



WILLIAM SIREY SR.
Plant Superintendent
Jervis B. Webb Co., Detroit

"... faster steel-cutting saws, feeding and unloading devices are needed"

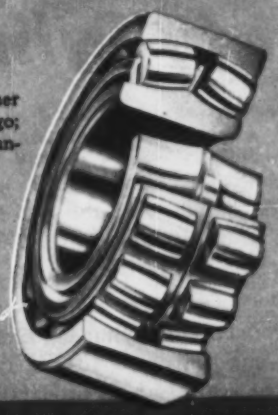
There will be a large demand for better machines and tools for the steel fabricating industry. In material handling equipment, weldments and machining are the main factors of fabrication. Some thought should be given in the design of machines for the future application of automation devices for feeding and unloading of the machines.

In fabricating the weldments, the design of these are such that it is almost impossible to fabricate without going into a lot of expense. Better cold bending machines are needed. Faster and more accurate steel cutting saws needed. This would take care of the cutting and bending operation.

Machining seems to be the bottleneck. We could use faster finishing and boring machines. Portable or semiportable machines could be used for milling or grinding plates on the frames after welding. These frames have a series of bearing plates welded at the top and must be kept level. Distortion to the plates will throw the shafts out of line of the bearings.

#1 **IMPROVED SPHERICAL ROLLER BEARING...**

Size for size, more capacity and longer life than any other spherical roller bearing. Introduced by SKF two years ago; now available in the popular series. Already adopted by hundreds of leading manufacturers.



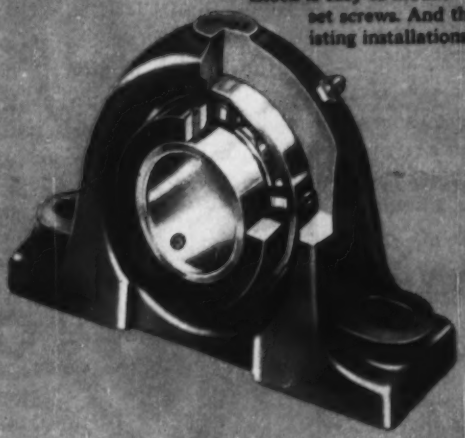
#2 **HIGHER CAPACITY CYLINDRICAL ROLLER BEARING...** With crowned rollers and cylindrical raceways, engineered for today's high speed—high load applications. Available with flanged or flangeless rings to meet design requirements.

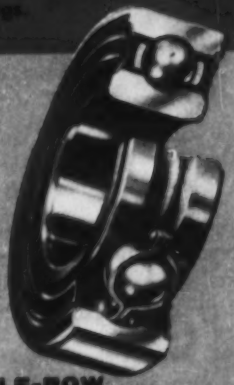
Four of the Many SKF QUALITY PRODUCTS

It's easier and safer to buy from SKF because SKF makes an exceptionally complete line of ball bearings and roller bearings and spherical roller bearings.

#3 **"SY" UNIT PILLOW BLOCK WITH SUPERIOR BEARING SEAL...**

Red Seals, of DuPont "Fairprene", team with a rotating flinger to exclude dirt and retain lubricant. The "SY" Pillow Block is easy to mount—just slide unit on shaft, tighten two set screws. And the "SY" is interchangeable with existing installations.





#4 **QUIETER RUNNING SINGLE-ROW DEEP GROOVE BALL BEARINGS...**

With proven SKF Red Seals which keep dirt out and lubricant in. Available with any of 13 combinations of Red Seals, shields and snap-rings.

To Get The Most Valuable Book You Ever Had...

Catalog #390 — Complete technical and engineering data on SKF's complete anti-friction line. Send for your copy to SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.— *manufacturers of SKF and HESS-BRIGHT® bearings.*

SKF®

BALL AND ROLLER BEARINGS

© 1955 SKF Industries, Inc.

(Advertisement)

Report to Cylinder Users . . .

Here at Miller Fluid Power we have a pattern which we follow. A goal at which we are shooting. The pattern isn't too simple. And the goal isn't an easy one. But we've been making progress. Our position right up in the van of the industry proves that.

Our job is the production of cylinders.–Basically, there's nothing anyone can do to alter a cylinder. It was old a hundred years ago. It probably won't change basically in another hundred years. But in the details of the cylinder, change is the major element.

Which is very much like industry itself. Basically industry has not changed since free enterprise was conceived on this continent. But in every detail it changes from year to year.

It's the Thousandths That Count

There was no single big thing wrong with the cylinders being manufactured yesterday. Just a lot of little things. So Miller Fluid Power made the improvement of little things its business.

We experimented with new materials and made safer, more dependable steel heads and caps. We hard-chrome-plated 110,000 PSI yield point steel to improve radically the piston rods. We raised the efficiency of operation to new peaks. Striving for quality in the smallest detail we improved in a dozen parts which are hidden from sight.

For instance, most cylinders leaked in operation. Miller made one that wouldn't leak. To prove it, we went away out on a limb and guaranteed leak-proof operation. And made the guarantee stand up.

We Learn by Listening to You

We saw our customers as thousands of men in thousands of shops wrestling with thousands of production problems. We made those problems ours and produced cylinders to whip those problems. Maybe we didn't revolutionize the cylinder business in the process. But we sure helped. We know that.

We learned to produce what we believed was the best cylinder on earth. We also learned that the best cylinder today wouldn't be good enough tomorrow. So, with the good one in production, we listened some more, experimented, and came up with a better one.

Miller Fluid Power is a young company in an old field. We are young, progressive, and willing to listen. We innovate without being prodded.

Discussion is a Two Way Street

On occasion we like to have others listen to us. Especially when what we have to say will help our customers. That is the idea behind our College of Cylinder Knowledge. We know a lot about cylinders. Though not as much today as we will tomorrow or the day after.

In our College of Cylinder Knowledge we try to show you what good cylinders can do for you. And what you should demand in any cylinder you buy. We meet other men who know what they want in a cylinder. We listen to their wants and try to explain what perfection in detail means.

We believe that when the users of cylinders sit down across the table from the producer who is trying to make the best, better cylinders result.

We'll be carrying that belief into the Production Engineering Show at Navy Pier in Chicago on September 6. Our College of Cylinder Knowledge booth will be open for that kind of discussion. We'll listen and learn.

The only way we can learn is from you. We can help you. But not until you've dropped that problem of yours in our lap. Your problem contains the stuff of which the better cylinder will be made. The cylinder that will have that quality plus which we like to think is the stamp of Miller Fluid Power.

Remember this when you see the sign over Booth 1819-23. We'll be there to listen to your suggestions, demands and questions. Also, because we are in the cylinder business, we'll be there to show you a cylinder you will want to buy.

Frank Flick

President

MILLER FLUID POWER COMPANY

2032 N. Hawthorne Avenue

Melrose Park Illinois

Visit Miller

BOOTH #1819-1823

Production Engineering

NAVY PIER SHOW CHICAGO

C. A. RYSTOGI
Manager-Manufacturing Dept.
Hotpoint Co., Chicago

"... press change-over will be easier"

During the next decade, industrial production is expected to increase 47 per cent, but there will be available only a 12 per cent increase in the labor force.

Improved methods over the years have increased the productivity per worker with a decrease in his physical effort. Quantity production has increased living standards by providing the economy with more products at lower costs. We, as a nation, are reaping the benefits of automatic production.

There are many types of production machines, but we at Hotpoint are mainly concerned with material forming, punching, fabricating.

In sheet metal work, we see more product design simplification, resulting in more standardized equipment. Presses will be made more adaptable to change-over from the manufacture of one part to another. Simpler hydraulic and air-type forming machines are being used, and there will be more conveyorized handling equipment with automatic transfer.

A. P. HIGGINS
Works Mgr., Convair Div., General Dynamics Corp., San Diego, Calif.

"... machine must be versatile to avoid constant threat of obsolescence"

Military aircraft are being designed for higher and higher speeds. They will create many problems in the design and material fields for the production of these aircraft. Now that we have successfully passed the sound barrier, and with tomorrow's even greater speeds, a new major obstacle arises. It is the thermal barrier. It presents the problem of intense heat, resulting from the passage of aircraft through the atmosphere at speeds in excess of the speed of sound.

The trend in high heat-resistant materials shows that they are difficult to cut and form. This may result in widespread adoption of such methods as ultrasonic machining, or machining by electrostatic discharge or forming by extrusion molding.

The major aircraft machine tool of tomorrow will have to be designed with tremendous growth factors. Consideration must be given to the need to handle many categories of machining problems. Parts designed one day may be obsolete the next. To be economically sound, the machine must be designed as a versatile unit to avoid the constant threat of obsolescence.

The machines of tomorrow will have to cut and form tougher materials of greater complexity than those we are producing. Tomorrow's machine must be one that is controlled by an intelligent form of automation.

RICHARD F. THUMA
Supt., Tools & Maintenance Section
Allis-Chalmers Mfg. Co., Milwaukee

"... our operations require both versatility and higher productivity"

Rapid machine tool development in the last decade has produced equipment with more weight, rigidity, power and increased speeds and feeds. The use of electronics and hydraulics has given us infinite variation, versatility and ease of control never before obtained.

Our present and future production requirements are diversified. Recent cutting tool research indicates machines of tomorrow must have even greater speeds with more power. Our operations require versatile equipment capable of a high degree of accuracy and higher productivity. Functional controls at the most convenient location, loading and unloading devices and arrangements for faster locating and clamping of work pieces will decrease machine setup time and increase production.

Use of prepositioning equipment for accurate positioning of tools to exact locations should be expanded on large machine tools.

Optimum productivity, of course, requires minimum outage for maintenance. We must produce faster, and do so continuously.

KEARNEY & TRECKER
expansion and new

See these outstanding machines in Booth 508

★ **New TK Series Milling Machines** — incomparably modern titans of general purpose production!

★ **New TF Series Milling Machine** — strikingly new models featuring remarkable twin-screw knee support.

★ **New Model CE Milling Machines** — the simplified, precision-built, economy producer for schools, maintenance and small tool work.

★ **New Ram Head Milling Machines** — versatile performers featuring combination arrangements of horizontal, vertical and universal spindles.

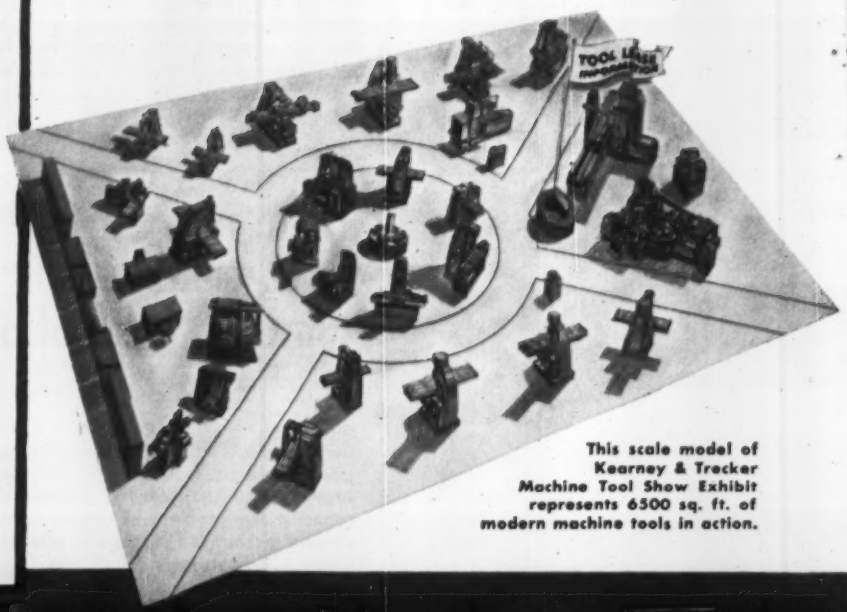
★ **New Mil-waukee-Mil Series Milling Machines** — flexible, power laden, broad capacity, bed-type production tools.

★ **New Autometric Precision Boring Machines** — superb vertical models introducing a non-wearing twin-screw measuring system.

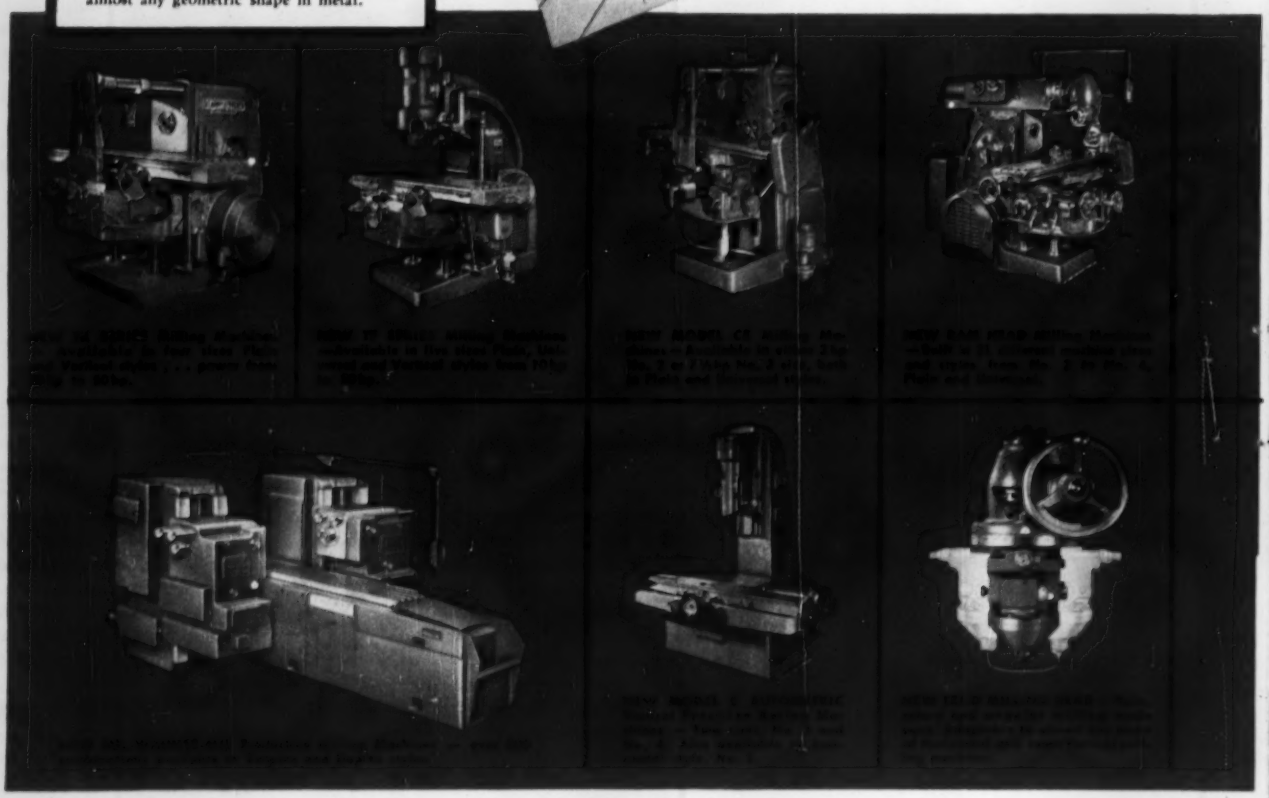
★ **New Automatic Transfer Machines** — Quill Feed unit, Way-Type Drilling unit, Lead Screw Tapping unit, Rotary Index Table, Feed Slide.

★ **New Compudex** — the precision indexing computer for rotary tables and dividing heads.

★ **New Tri-D Rotary Milling Head** — the amazing attachment which will produce almost any geometric shape in metal.



This scale model of Kearney & Trecker Machine Tool Show Exhibit represents 6500 sq. ft. of modern machine tools in action.



unfolds results of $18,700,000 product development program

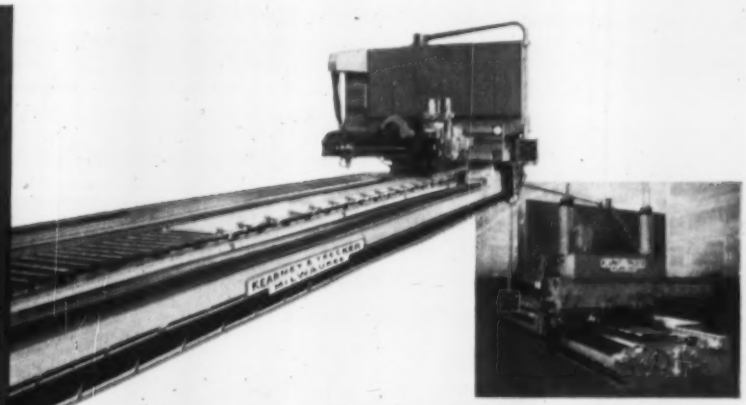
An extraordinary investment to bring you MORE PRODUCTIVITY and QUALITY . . . GREATER ECONOMY and PERFORMANCE in the new machine tools you buy from KEARNEY & TRECKER

Yes, the 1955 Kearney & Trecker Machine Tool Show story reflects a tremendous investment any way you look at it—$3,500,000 in new buildings and facilities; $8,900,000 in new tools and equipment; $6,300,000 in research and new product development.

And at the Show you'll see the positive results of this unprecedented eight-year growth and development program. You'll see 31 unusual exhibits featuring among them not one, but four new lines of knee-type milling machines comprising 81 different models, styles and sizes; an entirely new line of medium size bed-type production milling machines with electro-hydraulic pendant control; a new group of vertical precision boring machines; new attachments for rotary milling and precision index computing; automatic transfer type equipment — all of this and more to be seen and demonstrated in Booth 508.

Today, Kearney & Trecker offers you standard and special production machines that can meet any of your needs — with more productivity and quality, with greater economy and performance than ever before. What's more, you can obtain new machines either by outright purchase, conditional sales agreement or any of three Kearney & Trecker Tool-Lease plans.

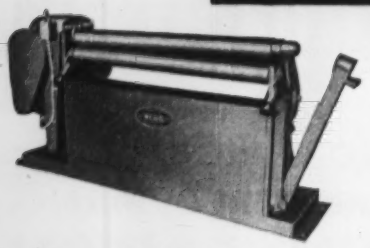
See or write your nearest Kearney & Trecker representative. He'll be glad to discuss your production requirements and what these new Kearney & Trecker machines can do to meet them.



NEW GANTRY-TYPE WING SKIN TRACER-CONTROLLED MILLING MACHINE — A 125-ton, 360° and rise and fall functioning giant of production, which is typical of recent Kearney & Trecker developments for the aircraft industry. Similar machines can be seen in operation at Kearney & Trecker's new Special Machinery Division plant in Milwaukee during the Show.

BUILDERS OF PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

WEBB PLATE FABRICATING MACHINERY



The Webb Corporation manufactures a line of well known Slip Rolls and Plate Bending Rolls . . . from models that handle the thinnest material to units that will take 3" plate.
This is the latest designed equipment on the market utilizing modern machine tool design.

NO FABRICATING MACHINE CAN OUT-PERFORM OR OUT-LAST WEBB MACHINES!

Ideally situated in the Midwest, we can promptly take care of your problems. Our trained personnel are available in all industrial centers to help you.

SLIP ROLLS

A complete line of small Sheet Metal Forming Rolls are also available. All power-driven with shaft sizes 3" to 5" for the handling of thinnest gauge material, up to 8 gauge plate. Special rolls for the forming of polished sheets, aluminum and stainless steels can be furnished. Complete catalogs on any size machine furnished at your request.

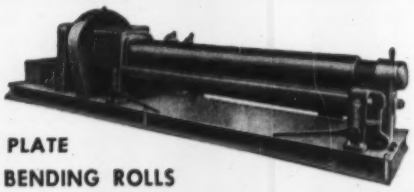
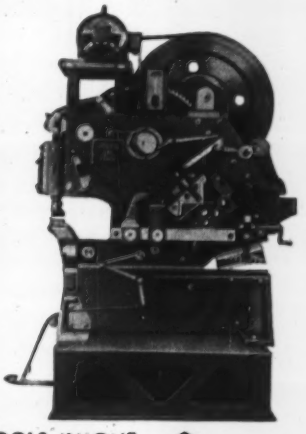
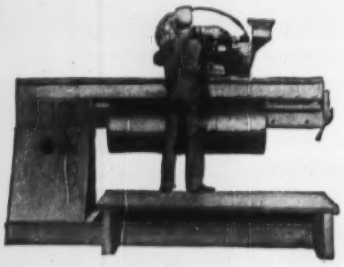


PLATE BENDING ROLLS

Designed and built for the forming of cylindrical shapes from rolled steel plate. Unique accuracy and speed for high quality production. Two types available: Initial Pinch type and Pyramid type. Anti-friction bearings and totally enclosed gear drives increase efficiency and safety. Special forming rolls for culvert pipe, stock tanks and other special shapes available.





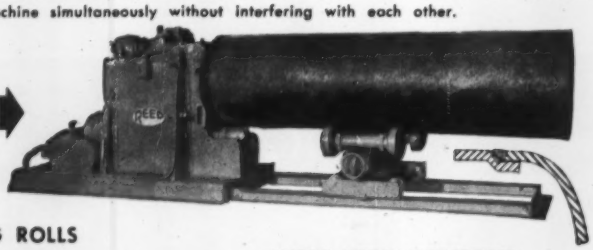
SEAM WELDER

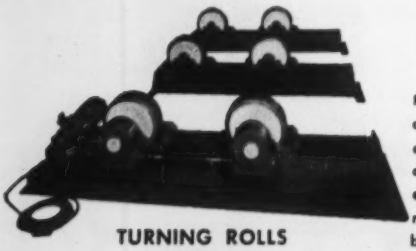
These fixtures are widely used for single pass longitudinal seam welding, using closed butt joints. This is designed primarily for cylindrical shapes and will also handle flat work and conical shapes. The material is clamped firmly in the jig in contact with the water cooled back up bar.

STEELWORKER—5 COMPLETE TOOLS IN ONE

The newest combination Punch and Shear for diversified or production work. Ready instantly for any of these operations: (1) Punch plates, bars or structurals, (2) Cut angles and tees with straight or miter cut, (3) Cut off round and square bars, (4) Bar and Plate Shear, (5) Coping or notching. The punch may be operated at the same time as either the section cutter, bar cutter, shear, or the coping and notching attachment . . . therefore, two operators can work at this machine simultaneously without interfering with each other.

WEBB-REED OFFSETTER





TURNING ROLLS

TURNING ROLLS

For manual or automatic welding and other operations requiring rotation of a cylindrical vessel. Units range in capacity from 3 tons up. Powered by electric motor with variable speed transmission. Readily portable, they may be used free or anchored to the floor.

WEBB-REED OFFSETTER

Forms an offset flange around shell ends to facilitate automatic welding of tank heads. It eliminates chill rings, decreases fit-up time, improves the concentricity of shell ends, and aids in reducing welding time. Shown with turntable for reversing shell ends.

COMPLETE LINE OF PRODUCTION MACHINERY FOR TANK FABRICATORS

WRITE FOR COMPLETE CATALOG

Since 1881 **THE WEBB® CORP.**
WEBB CITY, MO., U.S.A.

REPRESENTATIVES IN ALL MAJOR INDUSTRIAL AREAS

M. A. McCLAIN
Methods Engineer, United Engineering & Foundry Co. Pittsburgh

"... greater rigidity is a must. We are looking for higher speeds"

We are expanding our machine shops and foundries with an eye to estimated future needs.

We have found that our large machine tool departments must have more scope. Milling with carbide cutters is gaining much favor. The post-type milling and boring machine, with increased horsepower and right-angle milling attachments, will facilitate extremely large work. This machine must have column movement inward and outward so that spindle reach can be reduced to a minimum. Greater rigidity is a must.

We are continuously looking for improved measuring devices. This applies mostly to boring machines. Operators must be able to move from one bore to another accurately and quickly.

With the increased horsepower that we need in our machines and the improvements in carbide cutting tools, we are loking for high spindle speed ranges. We are sure that the 250 to 300 sfpm commonly used will be greatly exceeded.

Power traverse to all cutting stations is a must on new machines. Rapid traverse speed rates are being increased with the aid of nonmetallic liners and hardened replaceable ways.

W. H. LOGUE
Planning Methods Supervisor Caterpillar Tractor Co., Peoria, Ill.

"... electrical controls must be simplified ... down time minimized"

Demand for accuracy is becoming greater with the release of each new model or design. To produce this accuracy a machine must be built rugged, rigid and accurate.

The advance in cutting tools today and in the future requires more horsepower, and the machine must be capable of transmitting that horsepower.

The down time of the machine must be kept to a minimum, therefore improvement of machine repair and servicing is a must. More and more electrical controls demand that they be simplified, unitized and standardized. Chip removal and coolant maintenance should not require that the machine be shut down.

Automation or mechanical handling will be applied more and more to standard machines. This requires the machine be designed to take this equipment. Mounting pad and space will be required. Unitizing of electric and other controls will allow unit controls to be added to standard controls.

R. V. FISCHER
Manager-Manufacturing Westinghouse Electric Co. Pittsburgh

"... need better finishes on turned surfaces, formula for grinding wheel use"

With the rapid advance in speeds of rotating equipment, the demand for finer finishes is increasing. Builders of turning equipment could well put design effort into machines that will give surfaces equivalent to present day grinding tolerances.

It would be well to have a machine to drill and ream a hole for a hardened insert center for gears. Another that would be well received would machine and grind centers for perfect angle.

Grinding wheel manufacturers should provide us with a better formula for applying different grades of wheels to various types and hardnesses of material. The procedure should be to match wheel grades specifically to materials to be ground.

Until such time as cracks and burning can be eliminated in grinding, it would be extremely desirable to arrange for checking finishes and sizes on the machine itself while the operation is being performed. When it is necessary to move the part to check for cracks and burning, considerable time loss is involved.

It would be desirable to have a tracer-type machine that will turn and grind shafts and gears in one setup.

As the average man needs his car...

See... BAKER

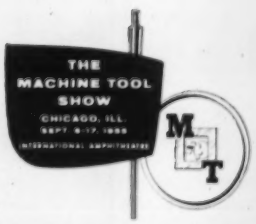
at the Machine Tool Show
Chicago — Booth 1421

Come in and see the low cost general purpose special machines at work in a practical demonstration of extreme versatility at very low cost.

INCREASED PRODUCTIVITY THROUGH
BETTER MACHINE TOOLS

BAKER BROS., INC., Toledo, Ohio

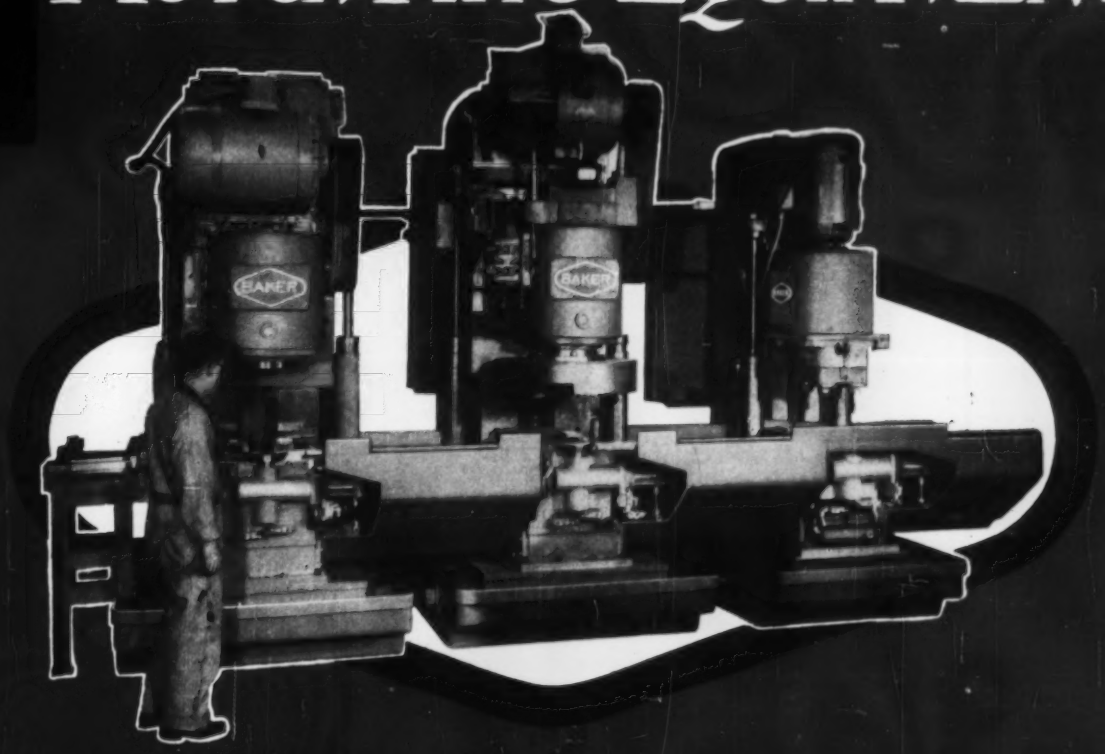
SINCE 1875



BOOTH 1421

So the Average Shop Needs and Now Can Afford

AUTOMATIC EQUIPMENT



The new Baker Transfer illustrated is to be introduced at the show. The Baker will be set up with a low cost, simplified fixture and combined to operate as a transfer machine, proving the possibility of providing automatic machines through use of STANDARD MACHINES. The machines Combination Bore and Counterbore . . . Face (cross feed) . . . and Multiple Drill . . . All Automatically.

FOR MORE THAN THREE-QUARTERS OF A CENTURY...

Standard and Special Drilling...Boring...Tapping Keyseating and Contour Grinding Machines

BUILDS EXTRA SELLING POWER INTO YOUR PRODUCTS

THEY *buy* A.W. STRIP *Steel, too!*

(Hot and cold rolled)

'They' are the people who buy products made with ALAN WOOD strip steel. 'They' are housewives, children, manufacturers—you and I.

Perhaps they can't always *see* the superior qualities derived through precise, metallurgical control and "custom-production" of strip steel—but they *do* know these qualities must be present—because of the product's strength, dependability and reputation.

If you require strip steel, your products deserve the "custom-produced" qualities of superior strip . . . for minimum waste . . . less wear and tear on tools . . . easier, faster production. They deserve ALAN WOOD strip steel.

For products requiring hot or cold rolled strip or sheets, call upon the services of a versatile, integrated steel specialist with modern, up-to-date, continuous mills—where steel is produced to your specific requirements—ALAN WOOD STEEL COMPANY.

IRON PRODUCTS
"Swede" *pig iron*
STEEL PRODUCTS
Plates (sheared)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip
ROLLED STEEL FLOOR PLATE
A.W. ALGRIP *abrasive*
A.W. SUPER-DIAMOND *pattern*
A.W. CUT NAILS
MINE PRODUCTS
COKE
COAL CHEMICALS

ALAN WOOD STEEL COMPANY

steelmasters for 129 years • CONSHOHOCKEN, PENNA.

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A. C. Leslie & Co., Limited

SM-39

"... we will watch tape or card controls"

WILLIAM TERBEEK
Works Manager
White Motor Co., Cleveland

Every indication points to our continued use of standard, universal machine tools. We expect future requirements will dictate progressively larger and tougher machines. Certainly, the trend in our truck line toward larger elements will obsolete some of our machines on a size basis alone.

We will be increasingly interested in developments, like tape or card controls, that will permit rapid low-cost setup and conversion from one job to another. Our adoption of carbide cutting means that we will look for faster cutting, more rugged machines. Maintenance continues to be a problem. The advent of more complicated electric, electronic and hydraulic circuits obligates the equipment builder to design for simplified maintenance. Reliability of components certainly is a part of the maintenance story.

Higher speed engines have and will continue to force us to tighter tolerances. We work in ten-thousandths where we used to work in thousandths. We will be working to half-tenths on many jobs tomorrow. New machines will have to give us those tolerances at a price we can afford.

"... we want more precision machines that are flexible enough to meet changes"

CHARLES SANFORD
Vice President-Manufacturing
Jack & Heintz Mfg. Co., Bedford, O.

The rapid pace of aircraft development for higher altitudes and greater speeds makes precise manufacturing techniques an urgent requirement. Weight and space limitations, coupled with extreme environmental conditions, require new materials and increasingly tight manufacturing tolerances.

Our production runs on rotating electrical equipment for aircraft are limited by the accelerated obsolescence of aircraft equipment and frequent design modifications. We need more precise machine tools that are flexible enough to meet frequent changes in our products.

We hope the machine tool industry can produce more single-purpose machines with universal applications that will have simpler and less costly automatic controls. Simplified controls would mean lower initial and maintenance costs. It would be easier to justify the investment in machines with automatic controls for our work if the automatic features were a smaller part of the machine cost.

Many new materials developed for aircraft present critical problems of machinability. Simpler and more easily varied speed controls will be necessary to solve the problems of machining new materials that will be common in the years ahead.

"... simplicity of setup is important"

ROBERT G. HESS
Vice Pres.-Mfg., Pesco Products Div., Borg-Warner Corp.
Bedford, O.

Without discounting the importance of improved methods, better material handling facilities and the use of incentives, the limitation of the machine tool is a measure of the limitation of the productivity level which can be attained. Machine tool builders should give serious attention to the productivity problem of manufacturers of precision products in low volume and a correspondingly high variety of models and parts.

Simplicity of setup and speed in change-over from one item to another is of great importance. Designers might consider the elimination of complex cams, positive depth control, and micrometer adjustments on depth or size control. It would be helpful if hydraulically equipped machines had calibrated dials or indicators giving direct readings for feed in inches per minute or inches per revolution.

Motors, hydraulic units, electrical controls and circuits should be positioned for ready maintenance accessibility. Adequate diagrams and repair and maintenance instructions should be fixed to the machines.

In the quest for higher productivity, safety cannot be disregarded. Machine tool builders should incorporate such items as chip guards or deflectors to reduce the hazard of machines running at high speeds and utilizing carbide cutters.

THE RIGHT SLANT. Her fashionable hat keeps its perky tilt, thanks to CF&I-Wickwire Hat Wire in the brim.

"NEITHER SNOW..." When the going's rough, drivers are thankful for tough, strong tire chains made of CF&I-Wickwire Chain Wire.

F O R T H O U S A N D S O F U S E S

from holding smart hats in shape... to holding cars and trucks on snowy roads, nothing does the job like wire!

The dramatic variety of jobs that wire can fill—almost infinite in number—is encountered every day in hundreds of diversified industries. Shown here are only a few of the countless uses to which wire can be put.

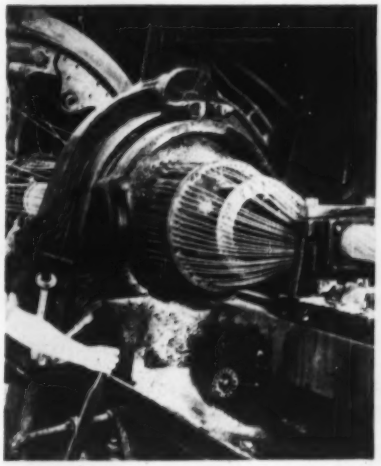
Wire, hair-thin to rod-thick, can be supplied with properties engineered to meet practically any need you may have for it. And CF&I-Wickwire Wire, with a century and a quarter of experience behind it, is ready to serve you by answering all your wire requirements.

Whatever you assemble, manufacture, or process, check into all the advantages you would gain by using CF&I-Wickwire Wire. You'll like doing business with CF&I-WICKWIRE, and the careful attention given your own particular requirements.

CF&I-Wickwire Wire is made in plants conveniently located from coast to coast. For detailed information, write our nearest district sales office.

SPEEDING AMERICA'S RECORD HOUSING PROGRAM. Stapling insulation to walls saves days of construction time and cuts building costs. CF&I-Wickwire Stapling Wire is used for all kinds and sizes of staples.

ALL WOUND UP. Here a submarine cable is being sheathed in CF&I-Wickwire Armor Wire for protection and resistance to mechanical failure.



DROPPING A MOUNTAIN with dynamite is accomplished with CF&I-Wickwire Fuse Wire for detonators.

IT'S CHILD'S PLAY to open today's sardine tins. Their sturdy key openers are made of CF&I-Wickwire Can Key Wire.

3143

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver
El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Oklahoma City • Phoenix • Pueblo • Salt Lake City • Wichita
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I

D. J. GRIFFITH
Engineering Dept.
Deere & Co., Moline, Ill.

"... controls should be co-ordinated"

If we are to expect our annual increase in productivity per man-hour to continue, motor horsepower applied to production processes, including all phases of materials handling, should double within the next ten years.

In the future, individual machines should be designed to permit the user freedom in applying mechanized load-and-unload equipment as his facilities are revised.

Locations for operating handles, lever and pushbuttons should be co-ordinated to match efficient motions by the operator.

Electrical control systems should be designed to prevent contact failure or electric power outage from damaging the machine. Electronic controls are preferred over electrical controls on those applications where their inherent characteristics produce a control function that is not realizable with electromechanical devices or where the static nature of their operation results in longer life and less maintenance in the equipment.

Certain industrial equipment is called upon to operate reliably in widely variable ambient temperatures. Under such conditions it is difficult to be certain that melting-alloy-type motor protective devices are equipped with the proper heater coils to prevent motor winding temperatures from exceeding safe values.

LEO J. KEVITT
Mgr.-Mfg., Alemite & Instrument Div., Stewart-Warner Corp.
Chicago

"... builder should make attachments"

We are in constant need of standard machines to be fitted into our facilities. In many cases we re-convert them to special machines. For both purposes the machine must be rugged and easily accessible for maintenance. Controls should be within easy reach of the operator. Electric equipment should conform to J.I.C. standards and should be centralized. The machine should include effective safety features for the operator and reasonable overloads. Besides these general features, we expect a good general appearance.

Cramped conditions for tools or chip disposal are a great handicap. We insist on automatic lubrication as the first requirement for upkeep and preventive maintenance. This has proved to be of considerable benefit costwise.

We would like to see higher speeds on some equipment to take full advantage of the tools available. In addition to this, better balancing and vibration controls for higher speeds must be considered.

The manufacturer of basic machines should make an effort to produce all desirable attachments. This would tend to better adaptability for proper spacing, room and mounting facilities for such items as dials, automatic feeds, horizontal or vertical operating motions, conveyors or hoppers. Proper application and provision for coolants should be explored.

R. C. ARCHER
Vice President-Manufacturing
International Harvester Co., Chicago

"... need is for automatic adjustment"

I would like to see in future machine tool designs rigidity and accuracy that will assure holding close tolerances.

The cost of our products is naturally an important factor if we are to remain competitive. In designing future machine tools such items as mechanization, work handling, automatic adjusting of tools to maintain accurate size, automatic gaging, operator safety and maintenance must be major considerations.

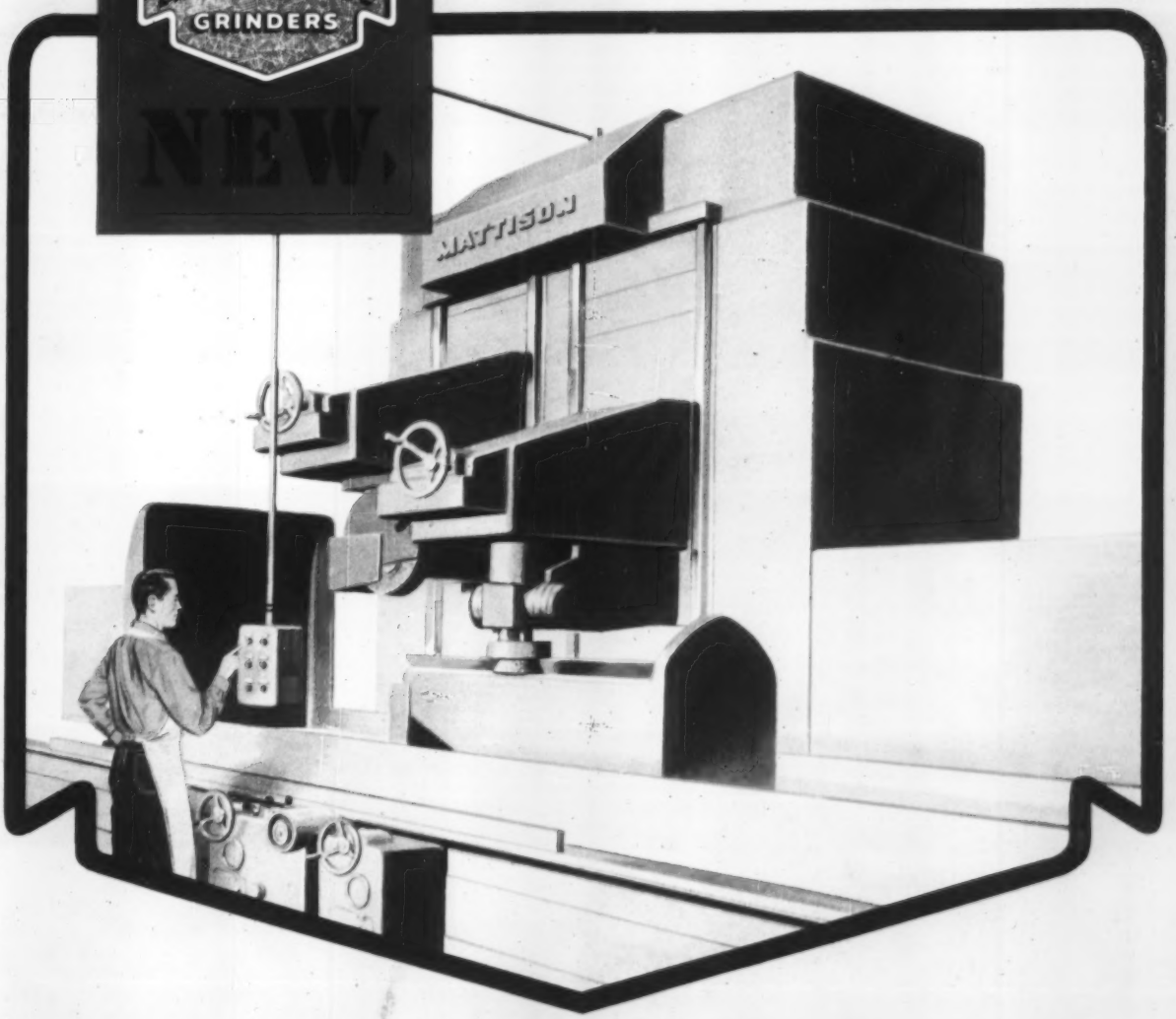
Specifically, we'll need equipment that will permit greater productivity. The need is for machines that will be automatically adjusted to maintain size; automatic gages at or near the machine tool so that it will not need constant adjustment; use of the feedback principle from gage to machine work table; and a reduction in adjustments needed to hold tolerances.

Maintenance of equipment is a major problem throughout industry. Not only the cost of repairs to equipment but also the loss of production during down time to make repairs must be considered.

I also would like to see continued emphasis placed on research into the field of feedback systems which would take the human element completely away from the operation.

MATTISON GRINDERS

NEW



MATTISON COMBINATION WAY AND SURFACE GRINDER

with independent vertical and horizontal spindles

It's a machine tool builder's machine, for grinding large bed castings, columns, tables, slides, saddles, and heads faster, to precision tolerances, without costly rehandling. You can grind "V" and flat ways, dovetails, shoulders, edges, radii, and contours . . . all in a *single setup*. Independent vertical and horizontal spindles permit you to hold two or more surfaces in exact relative alignment, grinding large machine parts faster and easier than ever before. Unique three-column, box-type construction assures maximum stock removal and fine finish. Entire machine is electrically controlled from the pendant. See new features demonstrated at the show, Booth No. 1422.

Special Issue

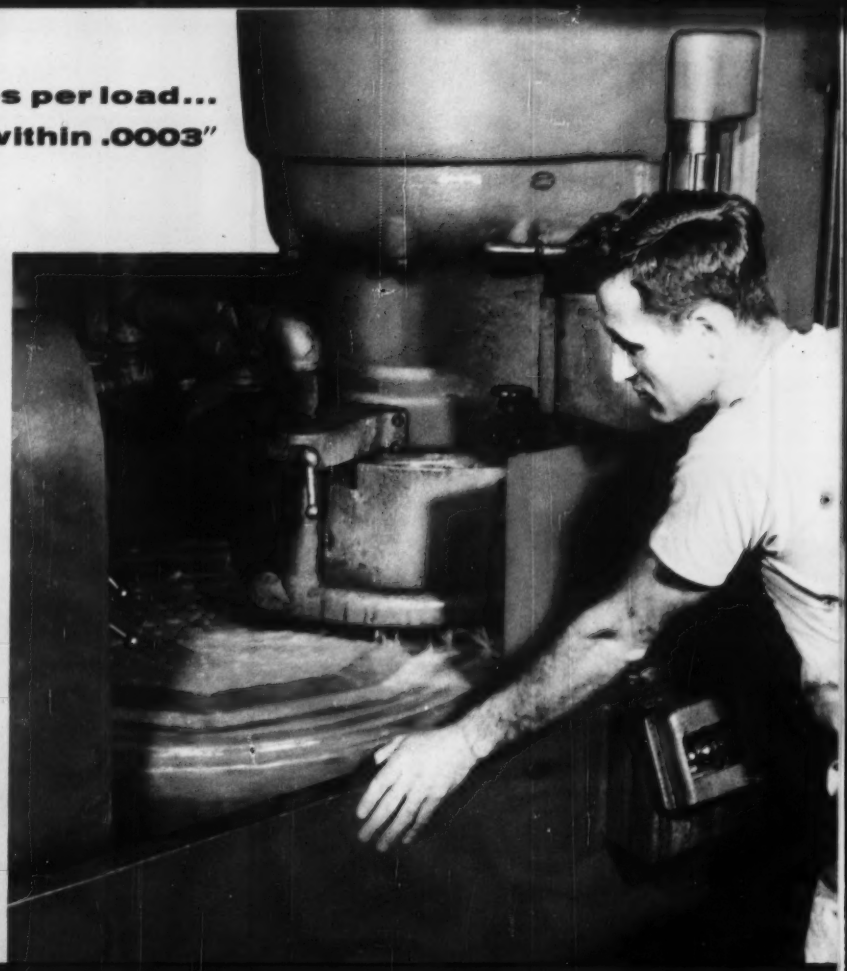
FEATURING MACHINES ON DISPLAY AT THE SHOW

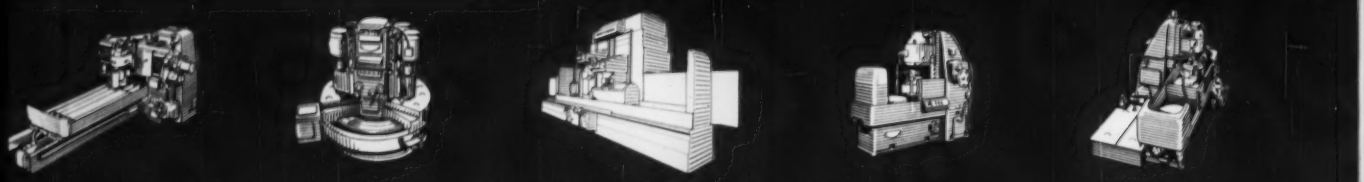
Grinds 262 reamer blades per load... holds size and flatness within .0003"

For over ten years the No. 36 "Vertical Rotary" has finish ground these hardened high-speed steel reamer blades, 262 per load on both sides, holding size and flatness within .0003". User reports exceptional finish (10 to 12 r.m.s.) using a 60 grit wheel.

Mattison Grinders hold accuracy through the years because the wide, extra-heavy vertical column is *one* solid piece, bolted to the end of the base. "V" and flat column ways are longer, wider, and thicker, preventing head slide from "binding." Thus, the machine feeds accurately in "tenths." And the universal head adjustment simplifies "tilting" and promotes accurate grinding on a wide range of work. See Mattison "No. 24" at the Show.

Unretouched photo exaggerates cross-grind finish, averaging 10-12 r.m.s.



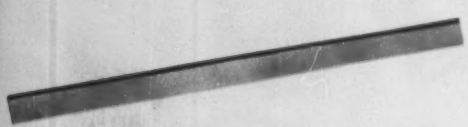


SEE MANY OF THESE HIGH-POWERED, PRECISION MACHINES IN OPERATION

Production doubled...setup time cut 25%...parallelism held within .0005"

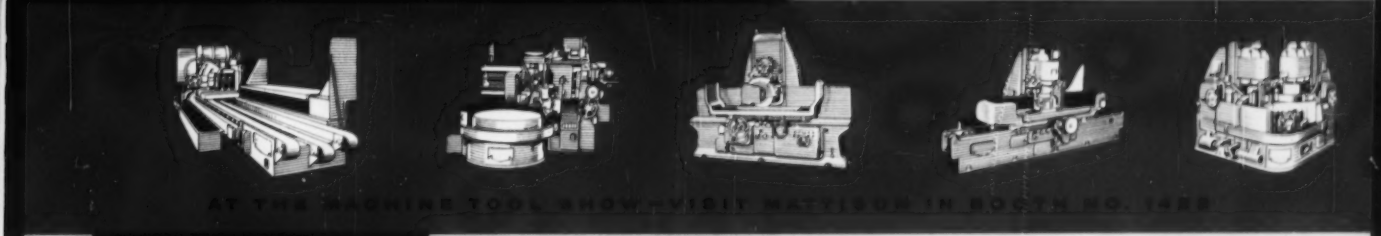
Production of wood planing knives is 100% faster . . . work is 25% more accurate . . . setup time has been cut 25%. That's the report on Mattison's High-Powered Precision Surface Grinder, which finishes two sides of these high-speed steel knives (Rockwell 64-65C), holding parallelism within .0005". Finish is 12 micro inches, r.m.s. Stock removal is .024"—production is 24 finished knives per hour. Here is a truly versatile method for fast, accurate machining of flat or contour surfaces. See it at the Show.

66 knives are ground per load on the 168" chuck.



Holds .001" tolerance over 123" length ...facing h-s steel shear blades!

Two sides of No. 4 welded high-speed steel shear blades are ground on the Mattison No. 400 Vertical Spindle Surface Grinder, holding a tolerance of .001" over the entire length. With a special 28" dia. wheel and approximately 7½" over-all work width, the grinder easily generates an accurate, flat surface . . . with stock removal conditions that assure high production, free cutting action, and fine finish. Accuracy is easily achieved on the "400SS" because the hydraulic table never overhangs the bed, even at extreme end positions. See it in Booth 1422 at the Show.



AT THE MACHINE TOOL SHOW—VISIT MATTISON IN BOOTH NO. 1422

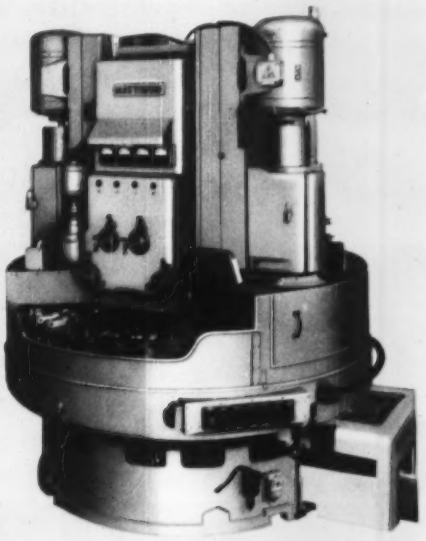
Grinds extra-fine finish on hardened ways, holding .0002" tolerance!

Fine micro finish is produced on these hardened machine ways, and accuracy is held to ± .0002", or better, finish grinding on the Mattison. Ways are SAE 52100, hardened to 64-66 Rockwell, C, and measure 107" x 4½" x 1-15/16". They are ground efficiently and fast, several pieces per load, on the Mattison High-Powered, Precision Surface Grinder.

MATTISON
HIGH-POWERED PRECISION
GRINDING METHODS

Four high powered spindles progressively finish rough forgings to close tolerances.

Grinds two sides of connecting rods and caps at rate of 375 each, per hour!



Continuous, single-pass grinding on the Mattison No. 72, Four-Spindle Rotary Automatic provides a low-cost method for machining flat surfaces, such as faces of these connecting rods and caps. Parts are clamped and unclamped automatically as fixtures rotate past actuating cams (see illustration). Operator merely loads and unloads the machine. Sizer gauges parts, and automatic feed compensates for wheel wear, minimizing downtime. Machine is powered for high stock removal, using self-dressing wheels, and rough grinds two sides of rods and caps at the rate of 375, each, per hour. See this machine and tooling at the Show.

Send parts to Mattison Methods Laboratory for sample grind and production estimate

The Mattison Methods Laboratory . . . equipped with all major types of modern surface grinders, face grinders, and disc grinders . . . introduces a new service to metalworking plants. You are invited to submit parts for sample grinds, production estimates, wheel recommendations, and other production requirements. Please include part prints, operation or route sheets, and all special requirements for machining your pieceparts. You'll get a comprehensive report based on close duplication of field conditions. With over 50 different grinders for production and toolroom work, Mattison can specify machines that meet your needs *precisely* . . . and give you maximum accuracy, productivity, and economy.

MATTISON
MACHINE WORKS
ROCKFORD ILL. U.S.A.

HIGH-POWERED PRECISION SURFACE GRINDERS

MATTISON MACHINE WORKS
ROCKFORD, ILLINOIS

BOOTHS 410 and 411 at the NAVY PIER

See the completeness and diversification of the Kennametal line of sintered carbide tooling, which includes several thousand individual items available from stock at all times to help you do a better job on any type of machining operation . . . to help you cut tooling costs, step up production, reduce machine downtime.

BOOTH 123, North Hall
INTERNATIONAL AMPHITHEATRE

Let us demonstrate the best techniques in grinding carbide tooling, at our service booth, as we recondition Kennametal tools used for demonstrations by machine tool builders during the show.

And we'll be glad to discuss your machining problems and how Kennametal can help you solve them.

Drop in at both booths . . . and be sure to get information about K21, the new Kennametal composition that is outperforming all other General Purpose Steel Cutting Grades. KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered Trademark

Most complete line of carbide tooling

Kennametal makes available top quality sintered carbide inserts, brazed tools, button tools, clamp tools and accessories, with cutting edges in diversified grades of hardness, toughness, heat and corrosion resistance and other properties. Write for a copy of Kennametal Catalog 55 and of Characteristics Book B-111.

Give your machines the tools they deserve ...the BEST

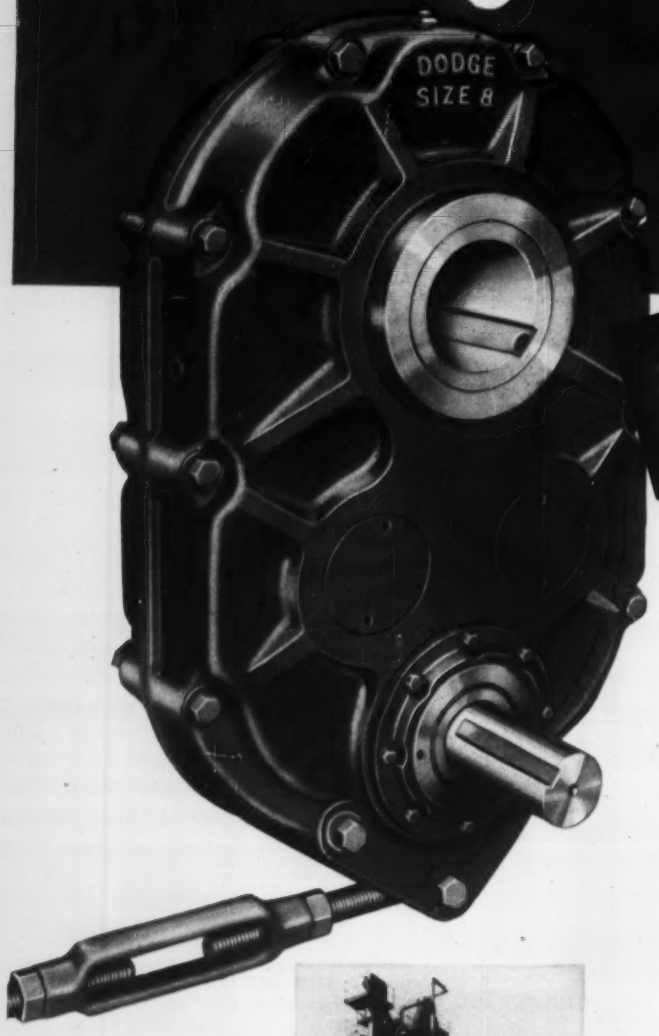
7269

Be sure to see the complete line of Kendex* Button Tools and K21... the New, Superior General Purpose Steel Cutting Grade

INDUSTRY AND
KENNAMETAL
...Partners in Progress

DODGE Torque-Arm

America's most complete

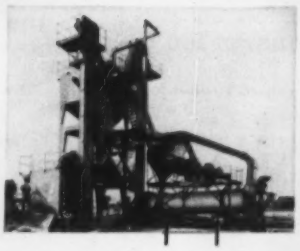


NOW-

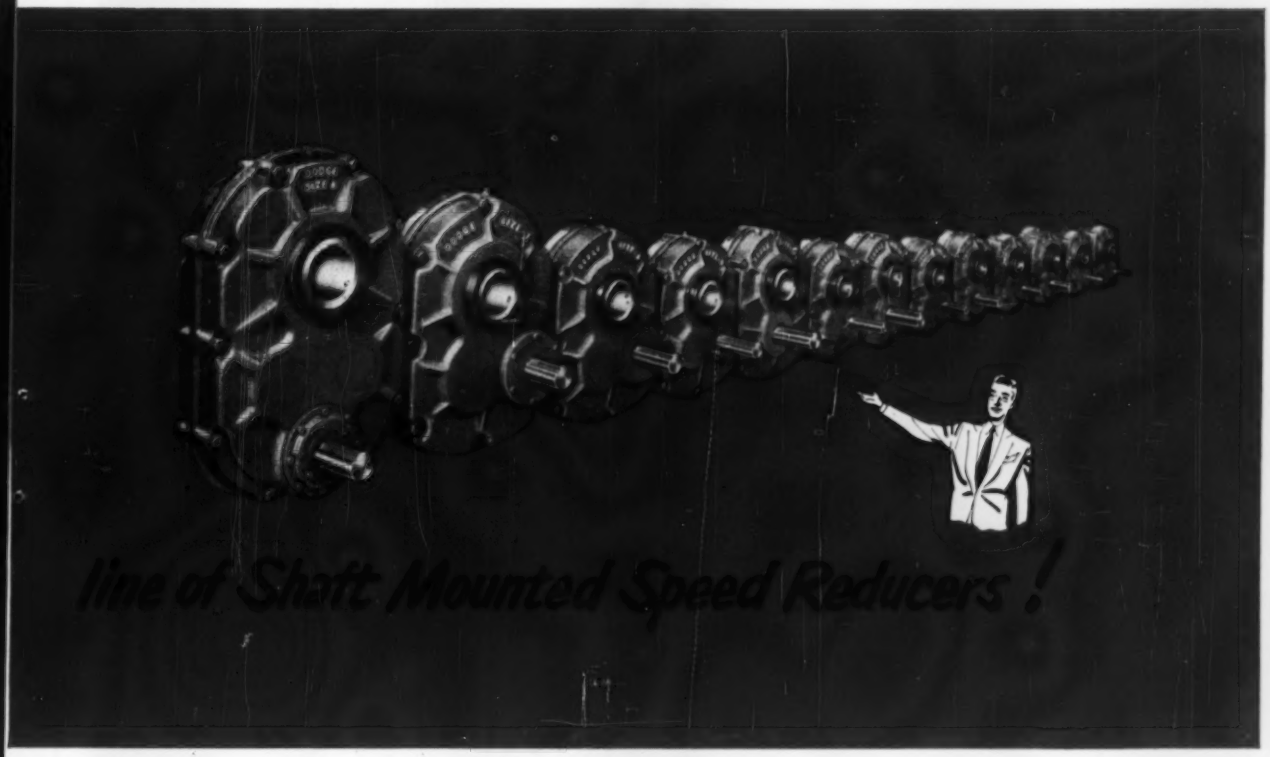
SAVINGS EXTENDED TO YOUR BIG JOBS WITH THIS NEW 60 H.P. SHAFT-MOUNTED SPEED REDUCER!

All the advantages of shaft-mounting . . . all the proven performance and economy features of Dodge Torque-Arm Speed Reducers . . . are now available for your *big* jobs. The husky new size No. 8, in the double reduction series, has a capacity of 60 hp at 100 rpm, AGMA rating, and can be mounted on shafts up to 5-inch diameter.

The performance record of Torque-Arm Speed Reducers, as demonstrated in tens of thousands of installations, shows efficiency up to 97%, and substantial savings in costs. These advantages will be even more significant in the big installations for which this newest addition to the line is provided.



Torque-Arm Speed Reducers driving the trunnions rotating an asphalt kiln.



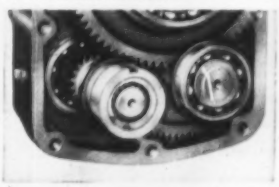
The new No. 8 has all the inherent advantages of the Dodge Torque-Arm line. No foundation, no flexible couplings, no sliding base required—and there are no lining up difficulties. It is mounted directly on the shaft. The torque-arm, fastened to any fixed object, anchors the reducer. The unit is driven through V-belt drive. Dodge Taper-Lock Sheaves, available from stock, permit any speed ratio desired.

Another new member of the Torque-Arm line is the single reduction No. 11 (1.3 hp at 100 rpm, AGMA rating). Torque-Arm Reducers are now supplied, in both single and double reduction series, with capacities from 1 to 60 hp, output speeds from 12 to 365 rpm. All sizes are available with built-in backstop as well as the Tri-Matic Overload Release which is designed especially for the Torque-Arm Speed Reducer.

For detailed information and recommendations for applications to your needs, call the Transmissioneer, your local Dodge Distributor. Or write for Bulletin.

DODGE MANUFACTURING CORPORATION, 4400 Union Street, Mishawaka, Indiana

Tri-Matic Overload Release, optional, loosens the belts, cuts off power, gives a warning in case of an excessive load.



Built-in backstop is available when conditions require a device to prevent the reversal of direction of rotation.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

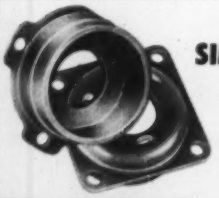
DODGE

of Mishawaka, Ind.

CARBURIZING

1 This is the operation for which the Leland salt bath was originally purchased. Work is heated at 1650° for 30 minutes, oil quenched and washed. A consistent, scale-free 0.005" case with surface hardness of R_{15N} 75/80 is obtained.

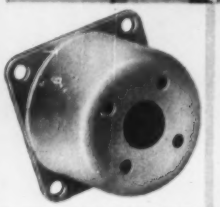
SIMULTANEOUS BRAZING AND CARBURIZING



2 Simultaneous brass brazing and carburizing cut cost from $79 to $13.11 per 1,000 parts, eliminated 3 handling operations, saved time. Average strength of brazed joints is 40,000 PSI. Case depth is 0.005"—0.007" with R_{15N} 80/85 surface hardness.

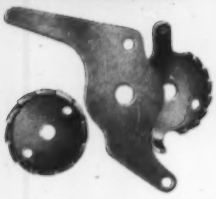
BRAZING

3 Ajax Salt Bath brass brazing of this assembly reduced costs from $14.20 to $9.10 per thousand—without considering the reduction in rejects from 25% to less than 1% and elimination of 3 additional treatments previously needed with copper brazing.



HARDENING

4 SAE-1050 and 1065 cold rolled parts are hardened in the same Ajax bath used for the 3 other operations. Hardened parts will bend 45° before fracturing. The "pick-up" of a superficially carburized case is not objectionable.



4 Cost-Cutting Operations with One AJAX Salt Bath

...that saved $37,000 the first 8 months!

Write for **details outlining the G. H. Leland Inc., multi-use operation of its Ajax salt bath.**

Let Ajax engineers demonstrate similar heat treating savings. You get actual proof on your own work samples in the Ajax Metallurgical Service Laboratories. No cost or obligation.

During its first 8 months on the job, this Ajax Electric Salt Bath Furnace saved $37,000 in the plant of G. H. Leland, Inc., Dayton, Ohio. This saving was figured after deducting *all* operating costs and 20% annual equipment depreciation!

Or, to put it another way, the amazing versatility of the Ajax furnace installation *enabled it to pay for itself in just a few months of use!*

Not only does the Salt Bath handle all four heat treating operations described and illustrated above . . . but the Leland model shop uses it for odd jobs as well.

Work is scale free. Distortion is no longer a problem . . . and the firm's entire parts processing has been effectively streamlined.

AJAX HULTGREN

AJAX ELECTRIC COMPANY
952 Frankford Ave., Philadelphia 23, Pa.

electric SALT BATH furnaces

Associated Companies: Ajax Electric Furnace Corp. • Ajax Electrothermic Corp. • Ajax Engineering Corp.

NEW! Heavy-duty relay in small space

This new CLARK Type "PM" Control Relay introduces a new concept in relay design: *Sectional Pole Construction.*

In this new relay, each pole is contained in its own melamine housing, and any individual pole can be removed or replaced from the front without disturbing the others. A short circuit is confined to a single pole and will not destroy the whole relay. Wiring terminals are on the front, and all maintenance including coil changing, pole or magnet replacement, is also from the front—without removing relay from panel. Contacts are quickly and easily convertible from normally open to normally closed and vice versa—from the front. Range of models provides relays with 2 to 12 poles. Exclusive design allows more contacts per square foot of panel space. In addition to the many advantages of SECTIONAL POLE CONSTRUCTION, you get a *heavy-duty relay in small space.*

For complete information write to

The CLARK CONTROLLER *Company*

Engineered Electrical Control — 1146 East 152nd Street • • Cleveland 10, Ohio

SEE THIS NEW RELAY AT THE CLARK EXHIBIT, PRODUCTION ENGINEERING SHOW, BOOTH 840
Navy Pier, Chicago — September 6-16, 1955

LE BLOND of Cincinnati

New 13" Regal

New 16" Apron

New 15" Dual Drive

New 32" Spindle

50" Roll Turning Lathe

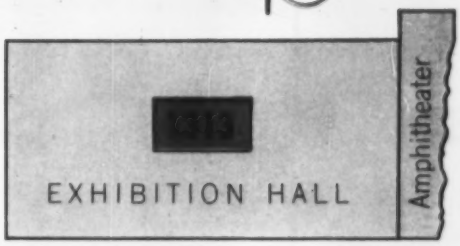
New Heavy Duty Bed

New Heavy Duty Tailstock

New 32" Heavy Duty

AT THE SHOW

We are extremely proud of the major design advancements you'll see at the LeBlond Exhibit—No. 1313, dead center in the new Exhibition Hall. You'll see 16 of the world's most modern lathes. You'll witness unique demonstrations in tracing, rapid boring and high-power turning. *Don't miss LeBlond!*



NEW 13", 15", 17" and 19" Regal Lathes

Famous for dependable performance at low cost, our Regals have been redesigned from the ground up! Big-lathe features include — Combined gear and belt-drive headstock. Replaceable hardened steel bedways. Separate feedrod and leadscrew.

NEW 15" Dual Drive Lathe

Best buy in the medium-duty class, the new Dual Drive features 16 speeds from 30 to 2400 rpm through a combined gear and belt-drive headstock. 5 hp. Replaceable hardened steel bedways. Totally-enclosed quick change box.

NEW 16" Heavy Duty Lathe

Most popular of the heavy duties, our new 16" provides 27 speeds from 16 to 2000 rpm through a combined gear and belt-drive headstock. 20 hp. Four way power rapid traverse. Replaceable hardened steel bedways. Enclosed quick change box.

RT Toolroom Lathe

Even today, other lathes can't match the advanced designs pioneered by LeBlond in the RT. Universal QC box—90 feeds and threads. Automatic chasing stop. Combined feed apron with built-in taper attachment.

NEW 25" and 32" Heavy-Duty Lathes

Cut with confidence at high horsepower! New headstocks use heavy, short shafts; 4-bearing spindle; provide adjustable accelerations for starting, stopping, jogging. 50 hp on the 25", 60 hp on the 32".

NEW 32" Special Heavy-Duty Lathe

You'll see well over 100 hp actually used at the tool. Built for Carboloy to test the newest in carbide tooling, this special 32" uses a 125 hp, variable speed drive, provides speeds from 42 to 1400 rpm.

NEW 25"/50" Sliding Bed Gap Lathe

A brand new model of this most versatile of lathe designs. Headstock provides 36 spindle speeds from 6 to 625 rpm. Adjustable acceleration for starting, stopping, jogging. New bed increases stability, easy cleanout.

50" Roll Turning Lathe

See how huge steel mill rolls are contoured in less than half former time. Two-directional hydraulic tracing from a simple template. Feed and speed can be varied during cut without leaving a tool mark.

NEW Automatic Crankshaft Lathe

Fifty-five crankshafts per hour are turned on the fastest crank-turning equipment yet developed. Five main bearings, flange and pilot, sprocket diameter and front end turned simultaneously. Transfer is automatic.

NEW LeBlond-Carlstedt Rapid Borer

Entirely new concept in high production of deep holes. Designed expressly to accommodate the new boring method and tooling developed in Europe. Don't miss this demonstration — *see holes bored 3 to 8 times faster than ever before!*

. . . cut with confidence

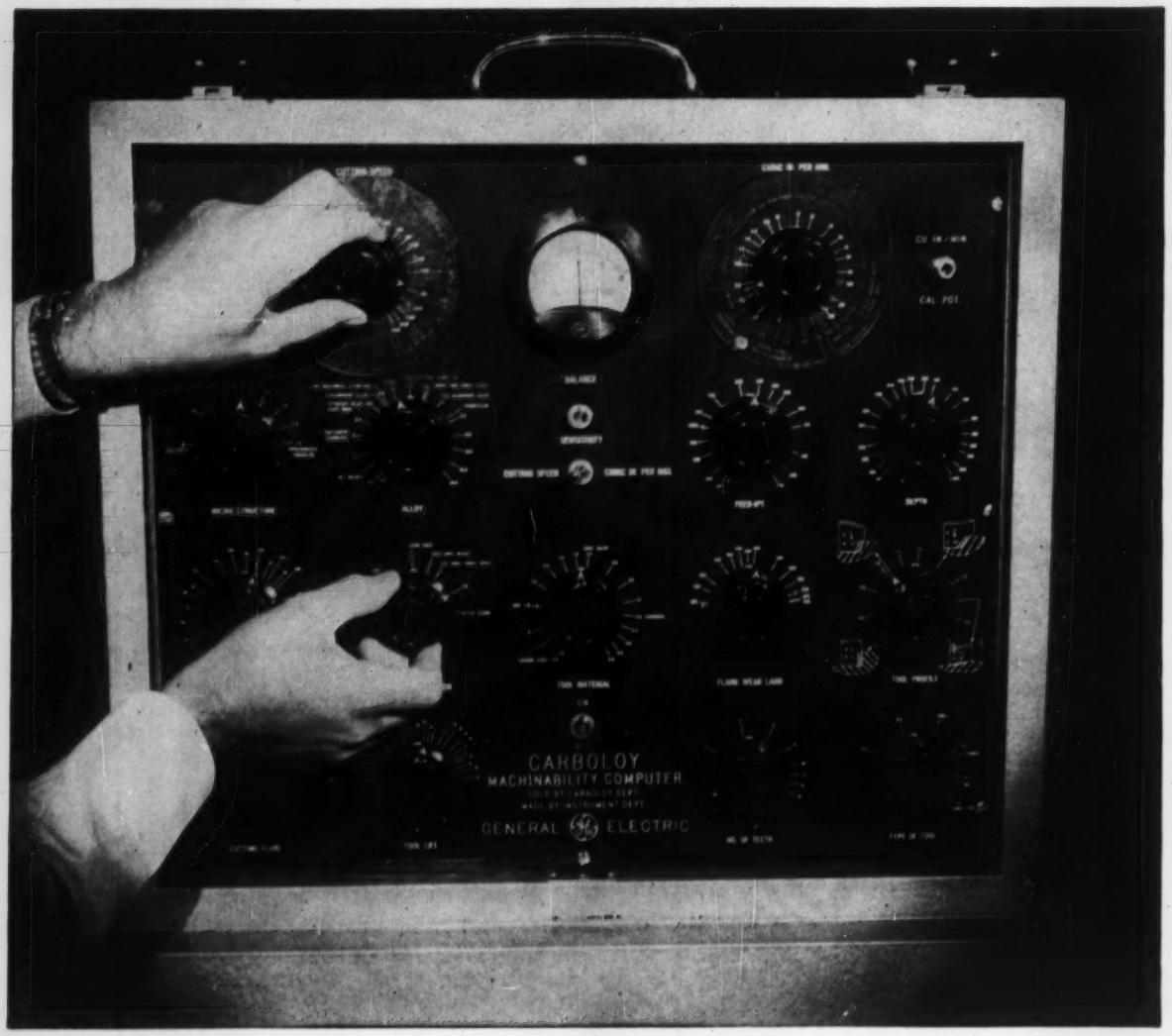
THE R. K. LEBLOND MACHINE TOOL COMPANY

CINCINNATI 8, OHIO

LEBLOND *of Cincinnati*

World's Largest Builder of a Complete Line of Lathes . . . For More than 68 Years

Carboloy announces the
CARBOLOY MACHINABILITY



To find an unknown variable like speed, output, or motor horsepower, simply set dials according to known information. Then turn dial of unknown variable until meter (top, center) balances at zero setting. Computer instantly shows what happens when any of the variables listed below are changed.

Computes values for any of these 19 operating variables:

Material Cut:
- Work material
- Microstructure
- Hardness
- Surface condition

Cutting Tool:
- Tool material
- Tool life
- Flank wear land
- Tool profile
- Type of tool
- Number of teeth

Cutting Conditions:
- Cutting fluids
- Feed
- Depth of cut
- Cutting speed
- Motor horsepower
- Cubic inches per minute
- Unit horsepower
- Work diameter
- R.P.M.

See the Computer in action at the Chicago Shows—September 6-17

COMPUTER

- **New engineering tool solves complex machine setup problems in seconds, instead of hours**
- **Shows how to vary cutting conditions to increase machine, cutting tool, and operator efficiency**

In seconds, the low-cost Carboloy® Machinability Computer calculates the effect of 19 basic machining variables on machine performance, tool life, and output.

In seconds, it shows optimum operating conditions for any metal-cutting job, eliminating wasteful experimental runs.

In seconds, it shows how to improve existing setups by the right variation of operating conditions.

Easy to use

The Carboloy Machinability Computer is easy to operate. Anyone with machining experience can use it after a short familiarization period.

Results are numerical – requiring no further interpretation from the direct-reading dials. Accuracy is assured – based on more than a year's testing on in-plant applications at key General Electric plants.

Handles many jobs

The Carboloy Machinability Computer handles basic information on operating conditions, type and condition of work material, style and material of tools. The computer accurately predicts cubic inches per minute removed, tool life, and required machine horsepower. It shows how changing speed, feed, depth of cut, or tool material will affect these and other variables.

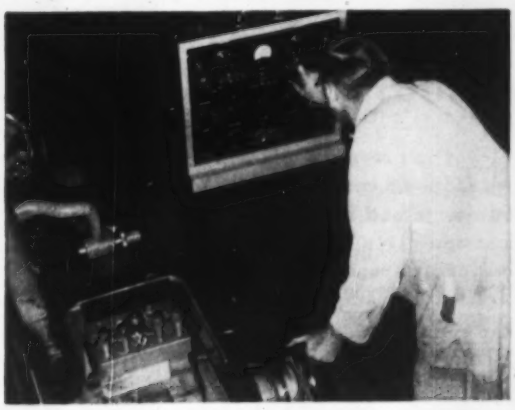
The Computer solves – in seconds – problems that would be otherwise impractical because of the large number of machining variables involved.

The Carboloy Machinability Computer was developed and proved in the field by a team of Carboloy and General Electric engineers, under the direction of Dr. W. W. Gilbert, of G.E.'s Manufacturing Services Division.

The Computer is portable (weighs only 32 lbs.), battery-operated, and measures 21″ x 7″ x 20″.

The price of the Carboloy Machinability Computer is ... **$495.** (f.o.b. factory, Detroit)

Whether your plant is large or small, the Computer can bring you immediate benefits. Send the coupon, below, for complete information.



TYPICAL IN-PLANT COMPUTER APPLICATION

PROBLEM: Setting up 16″, 10-HP lathe to turn hot-rolled 1020 steel bar with 10″ diameter, to get tool life of 1 hour.

SOLUTION: Starting from scratch on a new setup, *days* could be used by experienced tool men to find a satisfactory set of operating conditions . . . with no assurance that the result would be the best possible. With the computer, the optimum setup was established, and the effect of changing key variables compared, in less than *15 minutes*.

BENEFITS: Computer turned lengthy setup time into valuable production time. On this job alone, the savings gained through days of extra production, plus savings in manpower costs, would more than equal the cost of the computer.

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
11141 E. 8 Mile Street, Detroit 32, Michigan

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

Please send me more information on the Carboloy Machinability Computer.

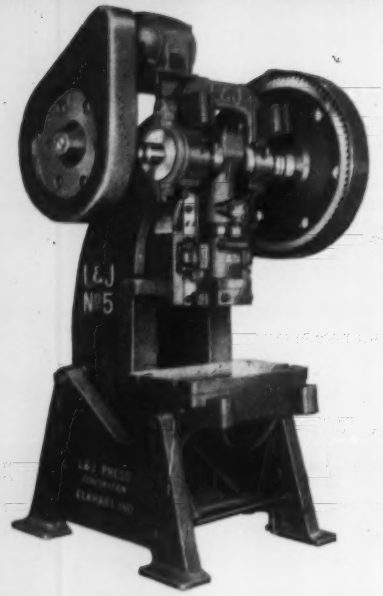
Name _____

Company _____ Title _____

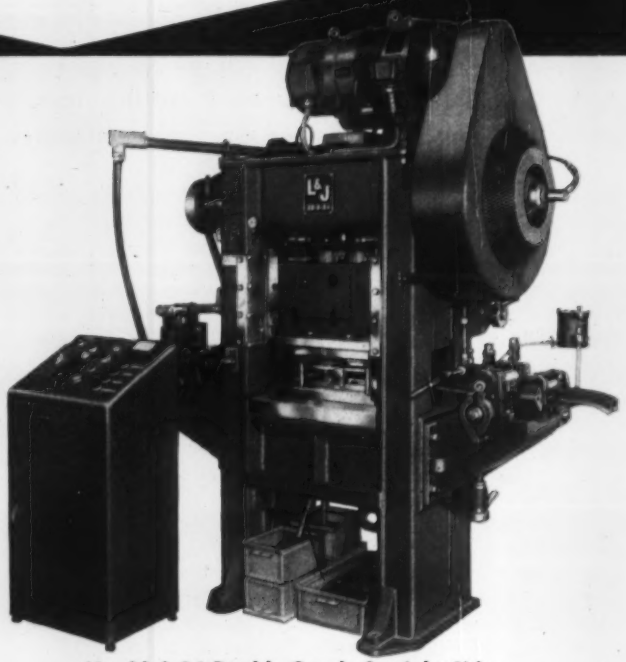
Address _____

City _____ Zone _____ State _____

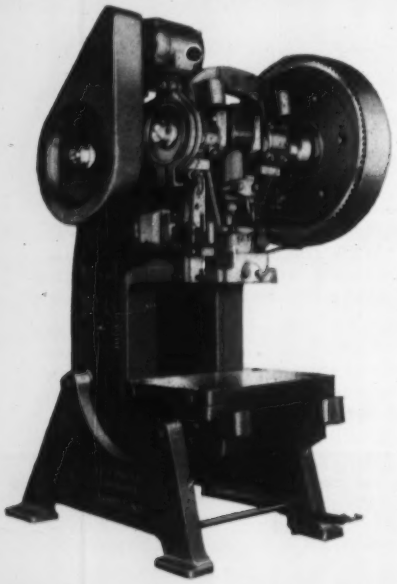
L&J PRESSES – Cost Cutters!



NEW No. 5 O.B.I. Geared Punch Press
Versatile, rugged press of 56 ton capacity. Air clutch available. Also non-geared model.



No. 20-2-24 Double Crank, Straight Side High Speed Press
High speed for small precision parts in volume. 20 ton capacity. Speeds to 450 s.p.m.



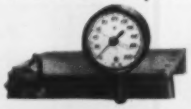
NEW No. 6 O.B.I. Geared Punch Press
Sturdy, efficient press of 65 ton capacity. Air clutch available. Also non-geared model.

SEE THEM IN ACTION AT BOOTH 407

The best way to prove the efficiency of L&J Presses is in your own shop—on your own work. You can see how their balanced design and rigidity minimizes deflection, holds tolerances and gives longer die life. You'll also find that they give long, dependable service with very little maintenance. Their big advantage is lower production costs.

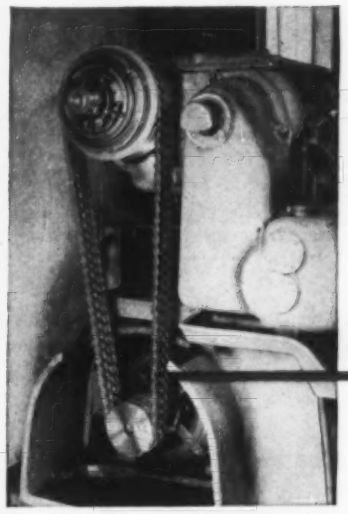
You can see them in action at The Machine Tool Show. Let us show you how they are built to give you better work. If we won't have this opportunity, write for literature.

L&J Press Corporation, 1628 Sterling Ave., Elkhart, Indiana



***NEW!* Press Load Indicator**
Measures press load under actual working conditions — very helpful in determining required press tonnage.

L&J PRESS CORPORATION
PRESS BUILDERS SINCE 1910



Performance Proves

20% to 90%

LESS VIBRATION

with Veelos—the Balanced V-belt

Engineers have long known that there are four principal causes of machine vibration: 1. bearings; 2. motor; 3. clutch; 4. sheaves. Often overlooked is a fifth cause: v-belts. And, in many instances, *v-belts alone* are the major cause of vibration.

There's a logical reason for this.

Regular v-belts have spots of varying density due to their construction. Normally, these spots are not apparent, yet they throw the belt out of balance when the drive is operating. As a result, vibration is created that can damage bearings, shafts and, most important, the finished work.

This is not true of Veelos v-belts.

Veelos is absolutely uniform throughout its entire length. Every link and every stud is identical. The smooth, machine-cut sides and the laminated construction assure smooth, vibrationless power delivery. Veelos is perfectly balanced.

In case after case, installation of Veelos v-belts has reduced machine vibration 20% to 90%.

Proof that Veelos will reduce vibration can easily be demonstrated with an electronic vibration analyser. This analyser measures amplitude of vibration to as low as 2-millionths of an inch.

Fifteen minutes of your time is all that is required to show you with the electronic analyser that Veelos creates less machine vibration. Drop us a line or clip the coupon for a demonstration.

VEELOS
THE LINK
V-BELT

Manheim Manufacturing & Belting Company
613 Manbel St., Manheim, Pa.

Yes, I would like a demonstration. **Have your representative call me for a convenient time.**

Name .....

Company .....

Address .....

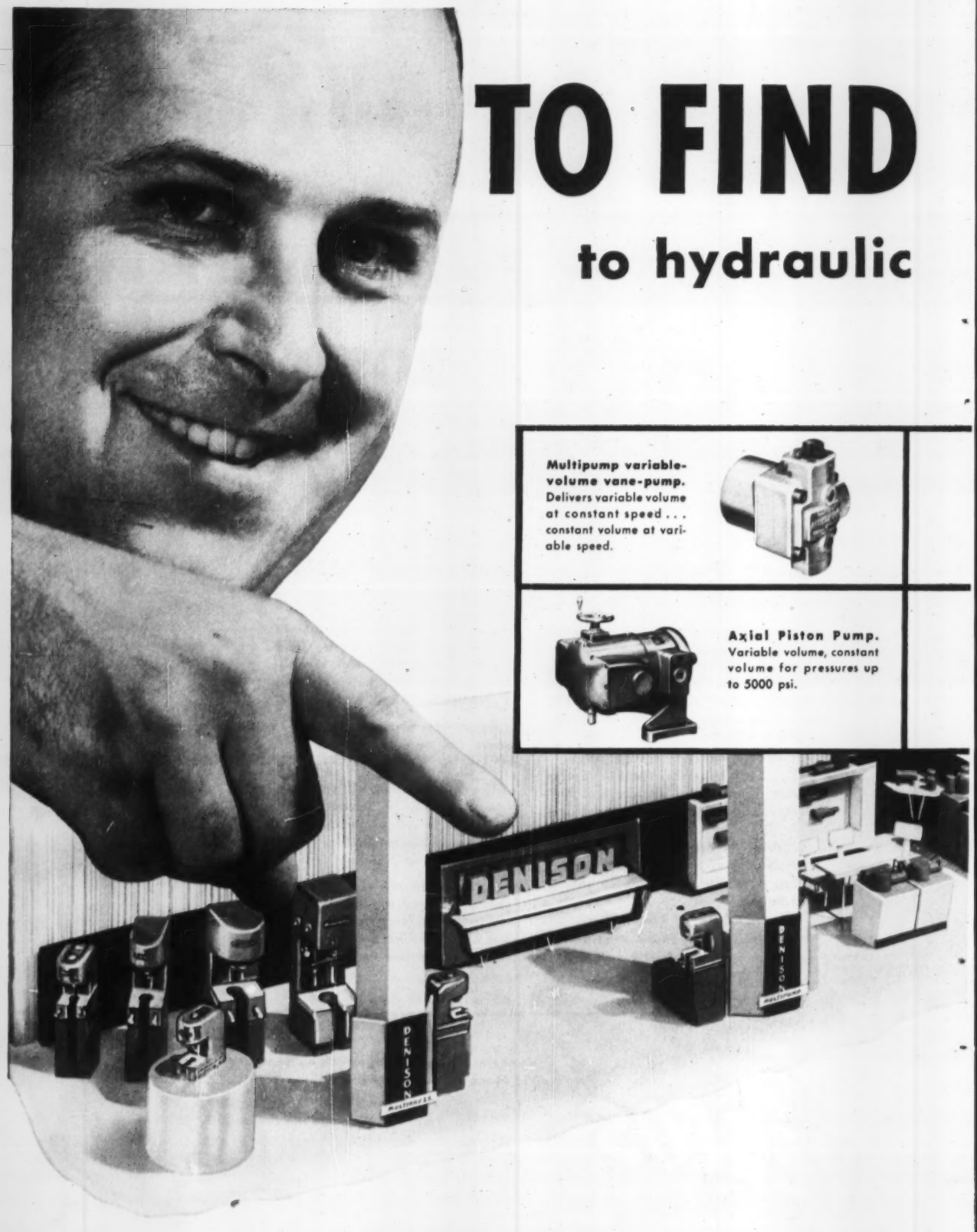
.....

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Veelos is known as Veelink outside the United States.

TO FIND

to hydraulic



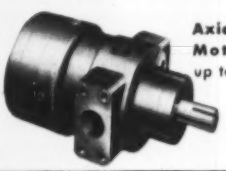
Multipump variable-volume vane-pump. Delivers variable volume at constant speed . . . constant volume at variable speed.

Axial Piston Pump. Variable volume, constant volume for pressures up to 5000 psi.

THE ANSWERS

power–speed–control

VISIT US AT **BOOTH 819**

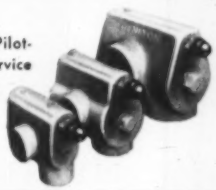


Axial Piston Fluid Motor for service up to 5000 psi.

Pressure Controls Relief, sequence, unloading, pressure reducing valves. Pilot-operated for circuits up to 5000 psi.

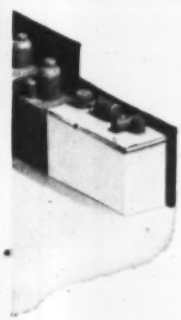
Multi-range Flow Control for full range regulation on variable speed circuits. For service up to 3000 psi.

Relief Valve. Pilot-operated for service up to 2000 psi.



Directional Control. 4-way pilot-operated, solenoid-controlled for service up to 3000 psi.

Pump-Motor. Vane-type, continuous duty to 2000 psi with bi-directional rotation.



WHAT'S YOUR PROBLEM?

Let Denison help you solve it . . . at Booth 819.

As a machine tool builder, Denison is privileged to demonstrate and display its entire line of precision hydraulic pumps, hydraulic motors and controls.

As a designer of machine tools and automatic machinery, you obtain data on Denison's latest developments in hydraulics . . . at the same time you witness a full line of Multipress in action.

While you are at our booth, one of Denison's hydraulic engineers will gladly suggest how to simplify your circuits, build greater dependability into your hydraulics . . . and cut costs of hydraulic equipment.

THE DENISON ENGINEERING COMPANY
1180 DUBLIN ROAD COLUMBUS 16, OHIO
Subsidiary of American Brake Shoe Company

DENISON HydrOILics

Here's a to spark

Remington Rand makes this quality steel part at less cost from Republic cold drawn special sections

REPUBLIC STEEL CORPORATION
3120 East 45th Street
Cleveland 27, Ohio

Please send more information on:

☐ Cold Drawn Special Sections ☐ "Nylok" Nuts
☐ High Strength Steels ☐ Tool Steel Warehouse Service

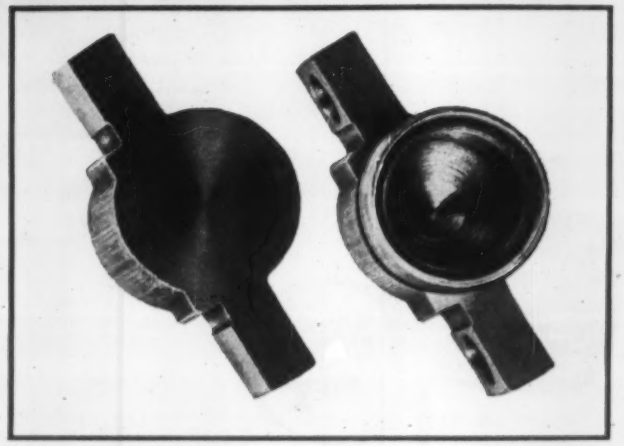
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

K-9033



THE AUTOMOTIVE INDUSTRY is a large user of Republic Special Sections. This wing bushing, above right, for a universal joint is made from the special shape shown above left.

cost-saving idea your imagination

The part is the margin rack for Remington's new Office-Riter. It is produced at less cost because much of the machining is eliminated. The production men at Remington Rand put it this way, "To produce this part from raw bar stock would require costly machining and would result in an inferior part." So they use Republic Cold Drawn Special Sections preformed to the predominating cross section of the part.

If you produce or design steel parts and are interested in reducing costs, you'll want to know more about cold drawn special sections supplied by Republic's Union Drawn Division. You'll want to know more about these advantages.

1. Flexibility in design is almost limitless.
2. Shapes obtainable in one piece replace costly assemblies.
3. Special sections simplify built-up, interlocking, or associated parts.
4. Benefits from cold drawing are higher strength, greater hardness, a bright smooth finish that rarely requires further machining.

Sections are made to your specifications in all grades of carbon, alloy and stainless steel. While large tonnage requirements are not necessary, they do result in greater economies. We can supply cold drawn special sections in large or small quantities to meet your requirements.

Give you an idea? Send us samples or blueprints of your parts. We will tell you promptly and impartially whether the nature of your parts would make the use of Republic Cold Drawn Special Sections efficient and economical. Mail the coupon for more information.

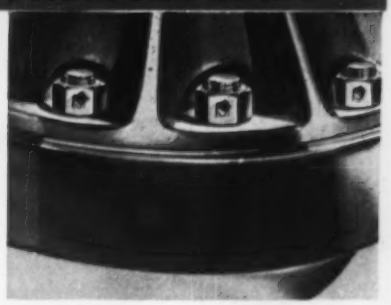
REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

HERE ARE MORE COST-SAVING IDEAS FROM REPUBLIC

SAVE SPACE AND INVENTORY COSTS on steels for tools, like these milling cutters, by using Republic's Tool Steel Warehouse Service. Warehouses in Detroit and Cleveland carry complete stocks of tool steels, automotive die steels, precision-ground flat stock, cold-drawn shank steel. A phone call brings what you need in a hurry, whether it's one piece or a truckload. Questions on steels, dies, heat treating and machining are answered expertly and promptly by our tool steel metallurgists.

HIGH DUCTILITY, PLUS PROVED WEIGHT SAVING, may make you want to know more about Republic High Strength Steels. Their application to various products permits weight reduction up to 25%. And when your product is designed and engineered all the way for high strength steel, weight reduction up to 50% is possible. Republic High Strength Steels are ideally suited for use in structural parts for earth-moving equipment, truck and gasoline trailers, railroad uses. They resist corrosion; extend equipment life by standing up to rough usage.



REPUBLIC "NYLOK" NUTS HELP REDUCE ASSEMBLY COSTS by eliminating lock washers, slotted nuts and cotter keys. Yet they assure positive locking in any position, even under severe vibration. Assembly is speeded, too, because either end of the nut is up. No special tools, lubricants or techniques are needed to start them. "Nylok" Nuts can be backed off for maintenance of equipment and reused. Investigate their use for your product. "Nylok" Nuts are only one of more than 20,000 types and sizes of fasteners made by Republic.

(Advertisement)

New High-Torque Unbrako self-locking socket set screws

set them, forget them—they stay tight

Up to 40% higher tightening torque—a new Unbrako feature

RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

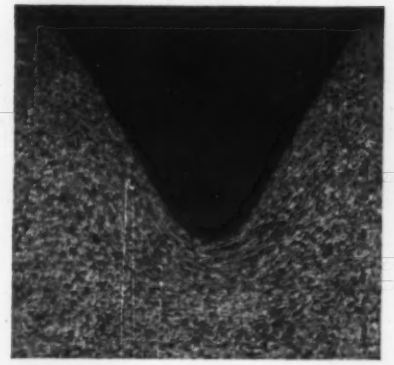
SCREW SIZE	UNBRAKO	B	C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

All UNBRAKOS can withstand higher tightening torques than ordinary set screws. For example, the recommended torque for a ¼" UNBRAKO is 87 inch-pounds —40% greater than that recommended for an ordinary set screw.

Research has proved that the tighter you seat a set screw the better it works. We went to work to design a socket set screw that could be tightened tighter than ever before without damaging the screw.

We formed a deeper socket. We put a radius in the socket corners. We developed fully formed threads. We established new methods of heat treatment in atmosphere-controlled furnaces. It took almost 6 years' research and development, but the new High-Torque UNBRAKO incorporates all of these improvements. And it retains the self-locking knurled cup point that keeps an UNBRAKO tight up to 48 times as long as a plain cup point set screw, regardless of the size of the point or the cup.

UNBRAKO SET SCREW

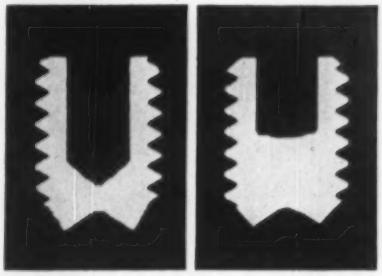


We fully form the threads—make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010" below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW

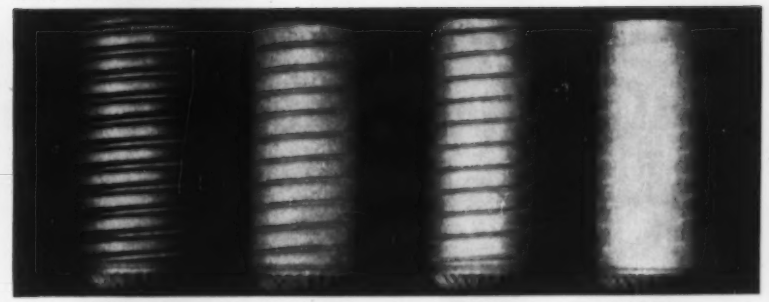
We put a radius in the socket corners—eliminate the sharp corners where cracks start. This distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower recommended torques.

UNBRAKO SET SCREW **ORDINARY SET SCREW**

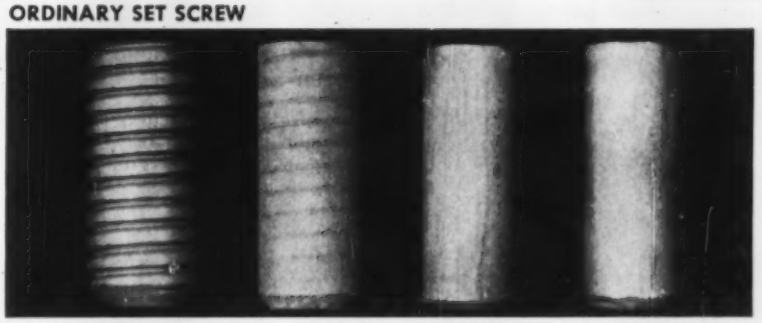


We form a deeper socket—give you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

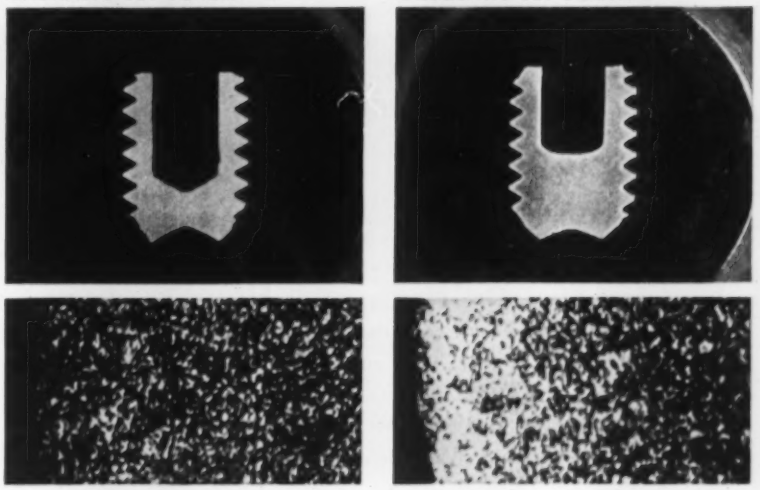
UNBRAKO SET SCREW



ORDINARY SET SCREW



UNBRAKO SET SCREW **ORDINARY SET SCREW**



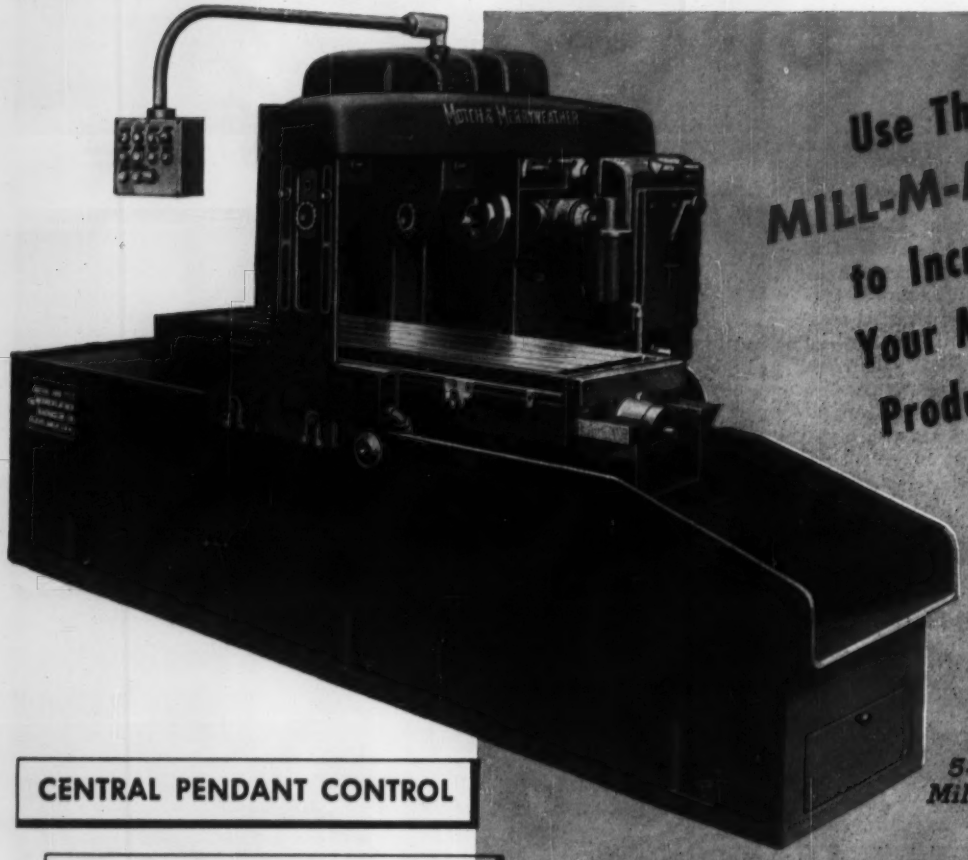
We heat treat an UNBRAKO properly. It's a ticklish job to heat treat a socket set screw. If you don't do it just right, you get decarburization. And decarb plays havoc with a screw. Put a wrench in the socket and you ream it. Run the screw into a tapped hole and you strip its threads. Try to seat the screw and its point shears off. These photos show the good and the bad. The UNBRAKO is clean. Its grain structure is uniform. There is no decarburization—the ordinary screw is suffering from an overdose of it, socket walls, threads and point are full of the telltale white spots.

You can't buy another set screw as good as an UNBRAKO. See your authorized industrial distributor today. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

Visit Booth 828 at the Production Engineering Show—see the new UNBRAKO High-Torque Socket Set Screw demonstrated

UNBRAKO® SOCKET SCREW DIVISION SPS JENKINTOWN, PENNSYLVANIA

See the NEW Motch & Merryweather MILL-M-MATIC PRODUCTION MILL at . .



Use This MILL-M-MATIC to Increase Your Milling Production!

Model 5-M-1842 Mill-M-Matic

- CENTRAL PENDANT CONTROL
- 25 H. P. SPINDLE DRIVE
- MECHANICAL TABLE FEED
- AUTOMATIC TABLE CYCLES
- RIGID OVER-ARM

You owe it to your production program to get all the details on this new *heavy duty* series of bed-type Mill-M-Matics. They utilize 25 horsepower through the spindle drive. Electrically controlled movements are mechanical to insure maximum rigidity and effective production with accuracy. . . The new Mill-M-Matic is now offered in a full range of heavy duty sizes by Motch & Merryweather, foremost builder of *traveling head* milling machines.

Copyrighted 1955 by The Motch & Merryweather Machinery Co.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

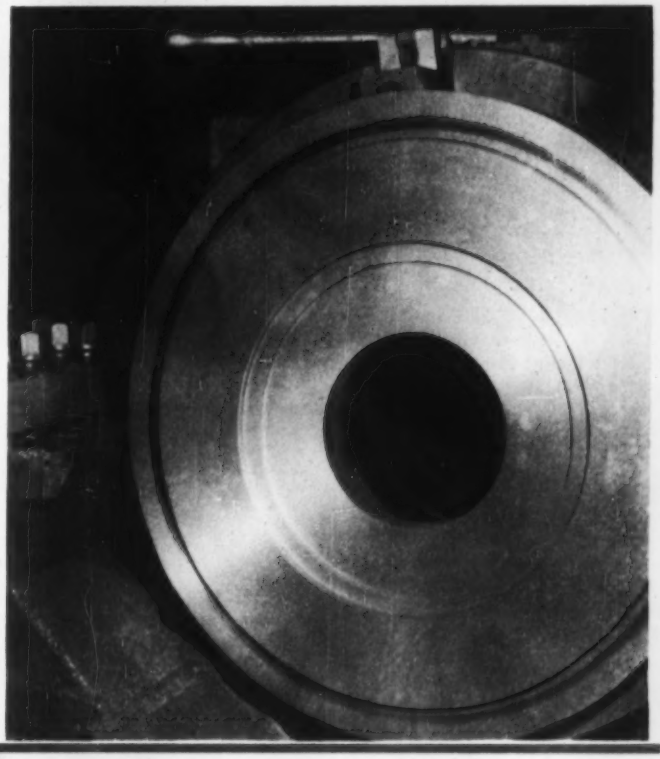
CLEVELAND 13, OHIO

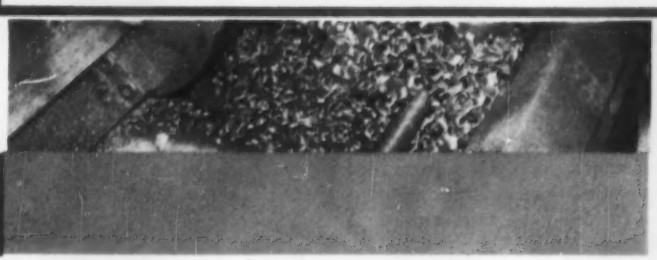
Builders also of Circular Sawing Equipment, Vertical Turning, Automatic and Special Machines

MACHINE TOOL SHOW

NEW MACHINE TOOLS AND EXHIBITORS

Machine tools described in this section are making their debut at the Chicago machine tool shows. The show and booth are given where each machine will be demonstrated. You will have the opportunity to see most of them in operation. A complete list of exhibitors for the three shows begins on page 230.

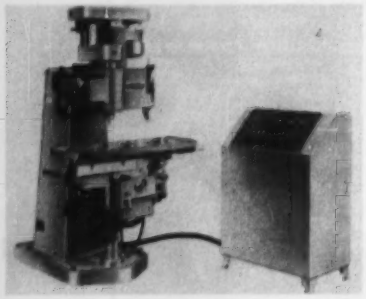




NEW PRODUCTS and equipment

Duplicator Mill

The Velvetrace machine uses a minute spark gap of high-voltage, low-amperage current between tracer and model. Surface of the model is made electrically conductive and is grounded to the machine. A variation in the gap produces a proportional change in the voltage. This is amplified electronically and used to control the magnetic clutches that drive the spindle quill and the transverse or longitudinal motions of the table.

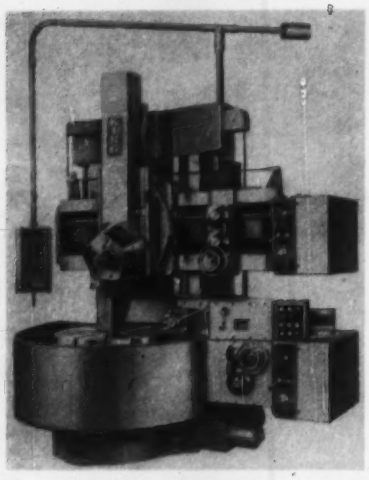


The machine reproduces (within its capacity of 12 x 9 in.) the details of nearly any three-dimensional model without contacting it mechanically. Operation of the unit is automatic. Spindle speeds range from 310 to 10,800 rpm. Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford 1, Conn. (Amphiteatre Booth 1219)

Boring, Turning Machine

One of a newly designed line, this 36-in., vertical, single-column machine has high horsepower ratings and expanded speed and feed ranges. Ratings are 40 to 50 hp on 30 to 46-in. sizes, 75 to 100 hp on sizes 56 in. and up. Twenty-four speeds and 24 feeds are available. Speeds are arranged in geometric progression in three standard ranges.

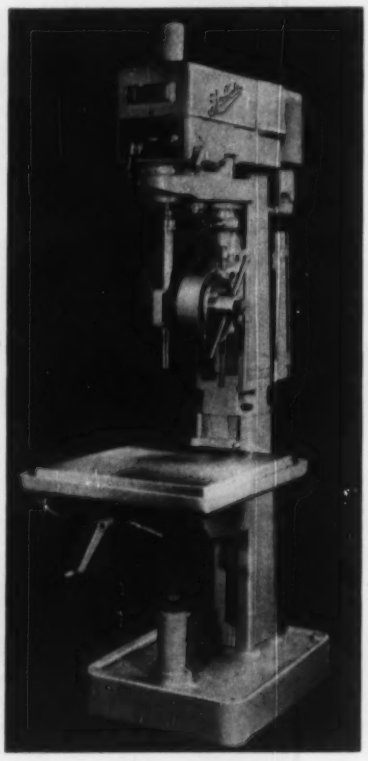
New design features: Improved mounting of spindle and all heads and turrets; use of antibacklash nuts for all crossfeed movements; improved sectional design of all frame elements; complete transmission mounted as a unit; angular placement of side-head ram, reducing ram overhang. A double-



column, 56-in. machine also will be shown. American Steel Foundries, King Machine Tool Division, Cincinnati 29, O. (Amphitheatre Booth 1121)

Variable-Speed Drill

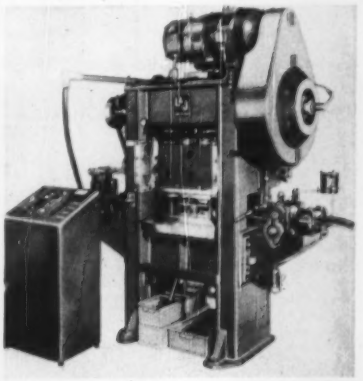
This RPMster has a capacity of 1 in. in cast iron and ¾ in. in mild steel. All drive gears have been eliminated; speed changes are made within two speed ranges, high and low. Low range includes all speeds between 100 and 550 rpm; high range gives all spindle speeds between 500 and 3000 rpm.



Speed changes within each range are adjusted instantly; change of range requires 10 to 15 seconds. The machine saves time by practically eliminating the delay of changing speeds for different setups in both production and toolroom drilling, tapping, reaming and other operations. Maximum distance from spindle nose to table is 28 in. Buffalo Forge Co., Buffalo, N. Y. (Amphitheatre Booth 610)

Double Crank Press

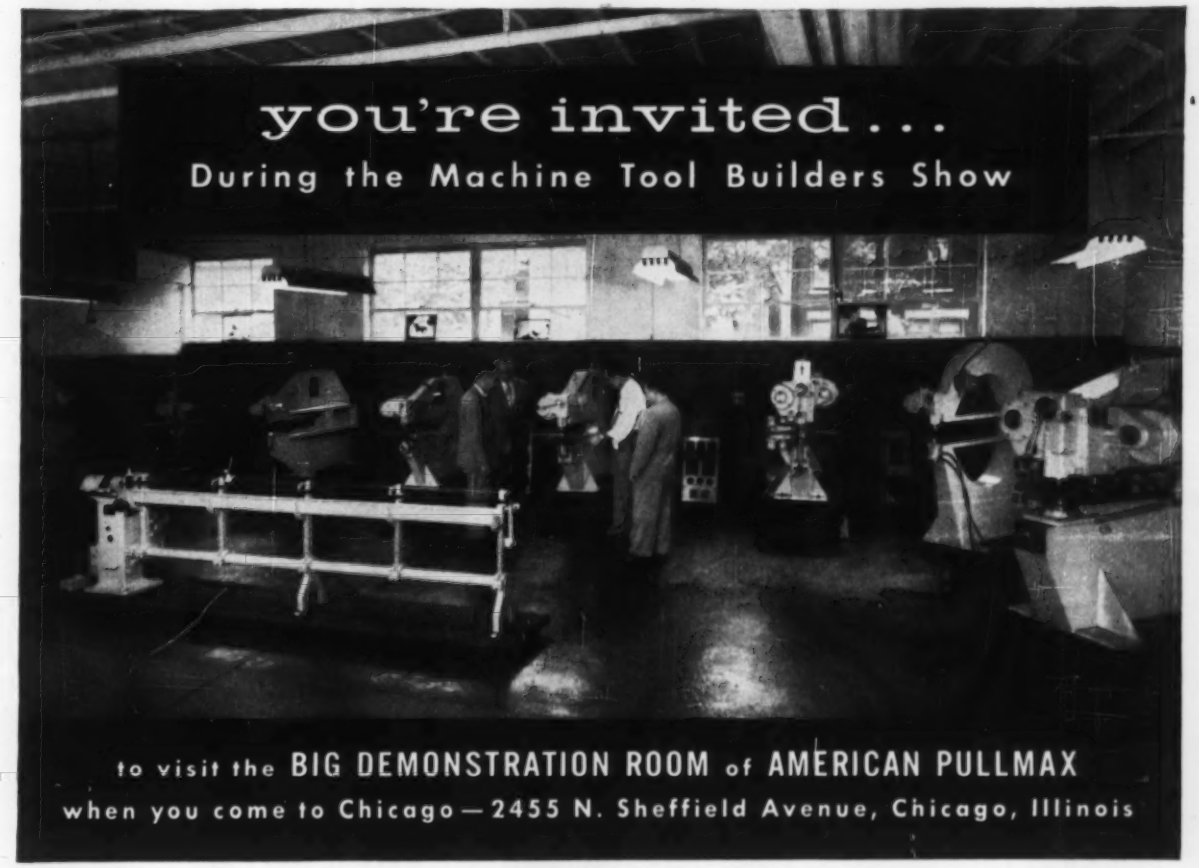
The No. 20-2-24 straight side, high-speed press has 20-ton capacity and a maximum speed of 450 strokes a minute. An air clutch with controls allows inching, single stroke and continuous running.



Other equipment includes adjustable rotary limit switch, air release spring set brake, pushbutton speed controls, flood oil lubrication system with pressure controlled switch, thermal limit switches in all crankshaft bearings, microswitch in die interlocked with clutch control, double roll feed by-pass-type roll lifter, scrap shear and stock oiler. L & J Press Corp., Elkhart, Ind. (Amphitheatre Booth 407)

Bed-Type Mills

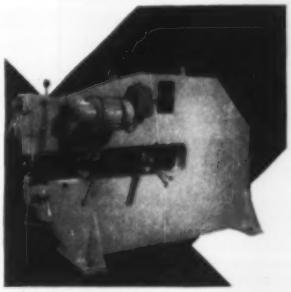
The Mil-waukee-Mil production machine comes in 93 simplex and 342 duplex models. There is a choice of 12 table sizes, three spindle heads, each with a choice of three horsepower ratings and three spindle speed ranges. Highlight of the design is an arrangement for automatic electrohy-


you're invited...
During the Machine Tool Builders Show
to visit the BIG DEMONSTRATION ROOM of AMERICAN PULLMAX
when you come to Chicago—2455 N. Sheffield Avenue, Chicago, Illinois

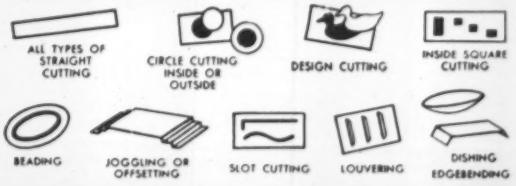
you'll be **AMAZED** at what **PULLMAX** does in metalworking

1 machine can do all these jobs in your shop

Ask any Pullmax user and he'll usually say, "I don't know how we ever got along without it." 7 sizes of Pullmax cut mild steel up to 1½". Pullmax does all the jobs shown here and generally pays for itself in three or four months by saving time, labor and material.



PULLMAX DOES ALL THIS WORK



If you're coming to Chicago for the Machine Tool Builders Show, the Coliseum Machinery Show or the Production Engineering Show from September 6 to 17, don't fail to visit Pullmax.

We'll have an exhibit at the Coliseum (Booth 120), but we want you to visit our big display and demonstration rooms at 2455 N. Sheffield Ave.

See all of the different Pullmax machines, the largest line of its kind in the World Market. See them demonstrated (or operate them yourself). See them work all gauges and types of metal (or bring your own job in to have it done on a Pullmax.)

Find out for yourself why everyone's saying this is the most amazing metalworking machine they've ever seen.

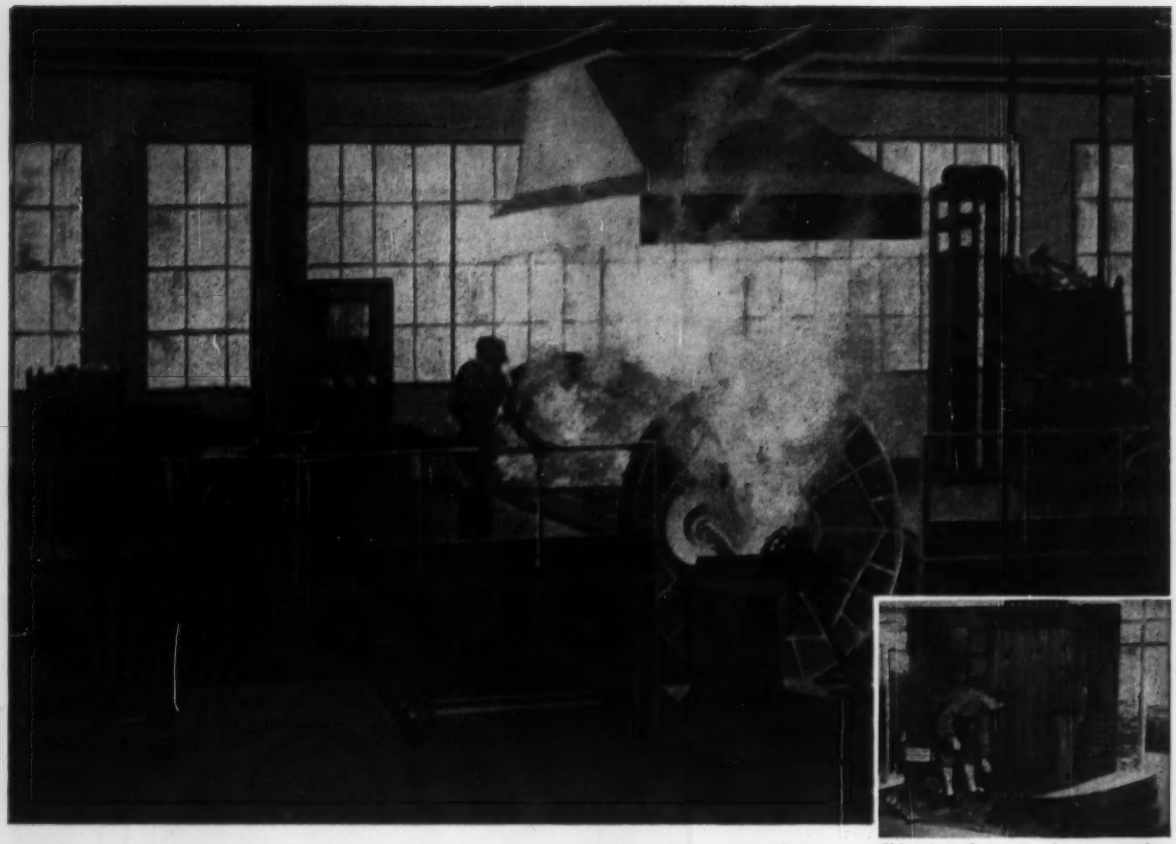
Pullmax Machines on Display at Booth 120
Coliseum Machinery Show, Sept. 6 to 17
Write for Tickets and Literature Today!

COURTESY CAR FROM LOOP HOTELS

Just call Diversey 8-5727 and one of our courtesy cars will pick you up at your hotel and return you after you've seen the Pullmax machines.

AMERICAN PULLMAX COMPANY, INC.

2441 NORTH SHEFFIELD AVENUE **CHICAGO 14, ILLINOIS**



Skimming the pot prior to pouring into tiny 1 lb. capacity band-and-wedge molds.

BRASS MELTING THROUGH 150 YEARS

According to tradition and available records, founders of the Scovill Mfg. Co. of Waterbury, Conn. were first in the New World to cast brass bars commercially for subsequent cold rolling, at the old Abel Porter casting shop in Waterbury, Conn.

From this modest beginning has grown the huge Scovill Works employing thousands of employees and producing enormous quantities of cold-rolled brass. One of the initial steps in the process is the melting of brass in three of the largest and most powerful electric melting furnaces ever made, one of which is shown in the picture above.

In the early 1800's the man-hour rate of production with charcoal pit fires was from 5 to 10 lbs. In the early 1920's when AJAX INDUCTION FURNACES were installed, the man-hour rate was 800 lbs. Since 1949 when the latest type AJAX furnaces were installed man-hour production has increased five fold, and is now 4,000 lbs.

These modern 1000 KW AJAX Furnaces have a holding capacity of 20,000 lbs. with an hourly melting rate of 5 to 5½ tons.

Photos at right show a unique demonstration staged by Scovill at the Hotel Statler in Hartford of America's first practical brass casting method. Here an operator in authentic brass caster's clothes of the period illustrated the casting of metal melted by the old bellows-blown pit fire used in the early 1800's. The tools were loaned by the Mattatuck Historical Society of Waterbury.

Pouring from pot into molds.

Opening molds after pouring metal into them.

AJAX ENGINEERING CORP., TRENTON 7, N. J.

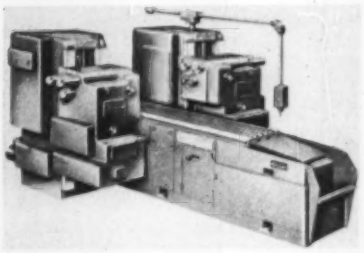
AJAX TAMA-WYATT

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

draulic program control for power feed of table, spindle heads and quills.

Standard features include: Table —24 feed changes, ½ to 50 ipm; power rapid traverse for tables under 90 in. is 300 ipm, for tables

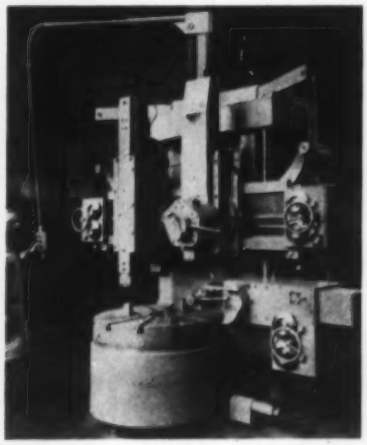


over 90-in. long, 200 ipm; spindle head—nine speed ranges each with 16 speed changes; vertical adjustment and quill adjustment; automatic spindle stop; pendant control for power movement of table feed and rapid traverse, spindle head, spindle stop and coolant. (Model 1848-B, 20-hp duplex style is shown.) Kearney & Trecker Corp., Milwaukee 14, Wis. (Amphitheatre Booth 508)

Vertical Turret Lathe

First of a new line, this 42-in. model features instant-power, remote-control shift, "joy stick" directional control of feed and traverse movements and screw fed rams.

The swiveling turret head for the right rail has a five-position turret which can be indexed in either direction. The side head has the ram screw and rear of the

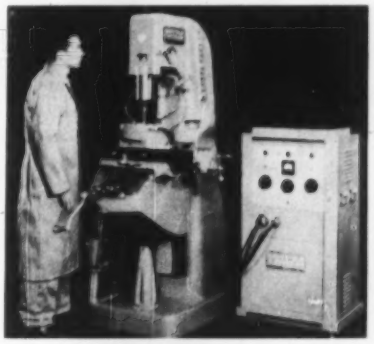


ram enclosed, to provide maximum life and accuracy. Four different heads are available: Right swiveling turret; right swiveling ram rail head; left swiveling ram rail head and right side head.

Table arrangements include standard plain table with radial and parallel T-slots; a three or four jaw combination chuck which can replace the plain table; alternate three or four jaw powered chucks which can be bolted to the table carrier assembly and the final spiral bevel drive gear. Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. (Amphitheatre Booth 710)

Ultrasonic Machine

Model 1000W Cavitron cuts, drills, embosses or transfers simple or intricate designs and shapes into the through-hard, brittle metals and materials such as carbide and ceramics.

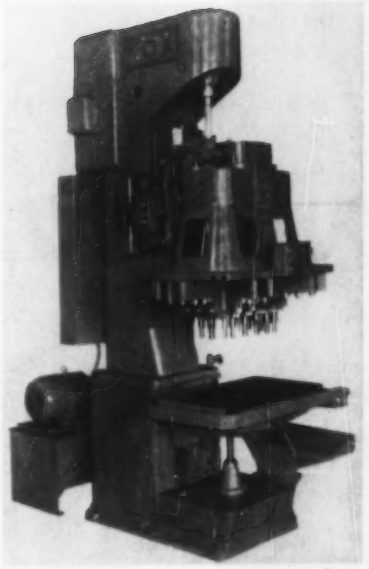


Machining is done by a cutting tool which reciprocates at ultrasonic speeds to drive an abrasive grit solution against the workpiece. Sheffield Corp., Dayton, O. (Amphitheatre Booth 1305)

Multiple-Spindle Drill

The E-60-HT vertical drilling and individual-lead-screw-feed tapping machine has a 12 x 24-in. head equipped with 16 spindle pinions. Head and slide are hydraulically counterbalanced. Spindle speed change, over a range of 202 to 990 rpm, is by pickoff gears. Both drill and tap cycles are automatic.

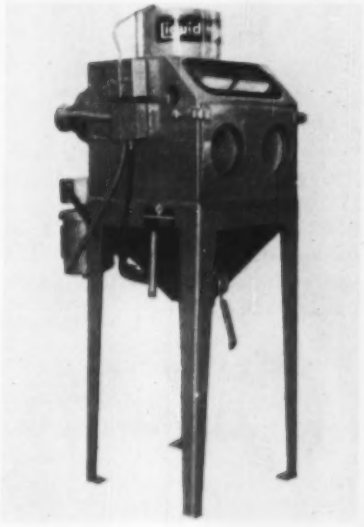
The hardened and ground steel ways are automatically lubricated. The hydraulic pump motor is 3 hp, the head motor 7½-hp, the coolant pump motor 1/3-hp. All



hydraulic components—the pump, control panel and lines—are readily accessible. Fox Engineering Co., Jackson, Mich. (Amphitheatre Booth 419)

Liquid Honing Machine

The VB Junior model 1818 cleans, surface finishes, descales, deburrs, hones tools and finishes any part that can be inserted through the 15½ x 9-in. loading door. The unit is self-contained; it needs only water, air, power and exhaust connections.

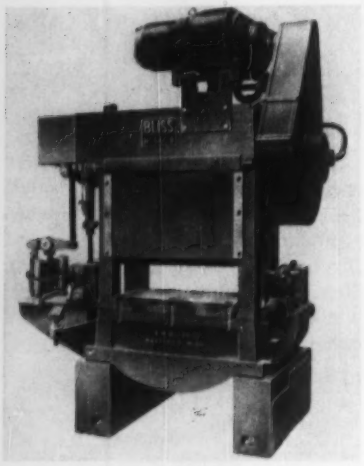


It operates on 15 to 20 cu ft of air a minute at 90 psi. It has a recirculating slurry pump with a 1/3-hp motor, filtered exhaust fan and motor, noncorrosive remov-

able filter, abrasive gun with air valve control, flexible hoses, knee-operated window washer, removable loading table and hopper with drain. Vapor Blast Mfg. Co., Milwaukee, Wis. (Navy Pier Booth 469)

High Production Press

Capable of over 450 strokes a minute, this press has a rack and pinion drive and overrunning clutch on the feed mechanism. All controls are mounted on a separate pedestal to protect them from dirt, dust and accidental damage. The pedestal, linked to the press by cable, can be moved easily.

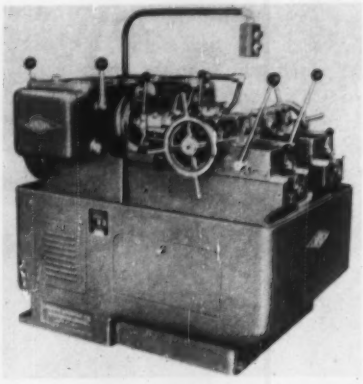


Within the right leg of the press is the return oil system—a large oil reservoir, filters and pump. Electrical interlocks in the oil lines guard against pressure increases or decreases. E. W. Bliss Co., Canton, O. (Amphitheatre Booth 1414)

Threading Machine

A pushbutton controls starting, jogging, stopping and spindle direction on the 6C Landmaco double-spindle machine. The station, mounted on a pivot arm, can be moved to either side of the machine.

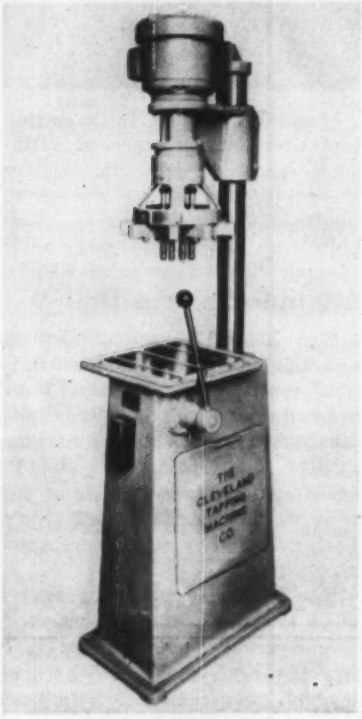
Either a Lanco hardened and ground or Lanco heat treated threading head can be used. Both are equipped with tangential chasers. Spindle speed ranges of eight or nine are standard. Speed change is effected through two levers on the headstock.



Carriages are operated by levers or handwheels. Each vise is adjustable, both horizontally and vertically, to assure proper work alignment with the die head. Landis Machine Co., Waynesboro, Pa. (Amphitheatre Booth 1406)

Drilling, Tapping Machine

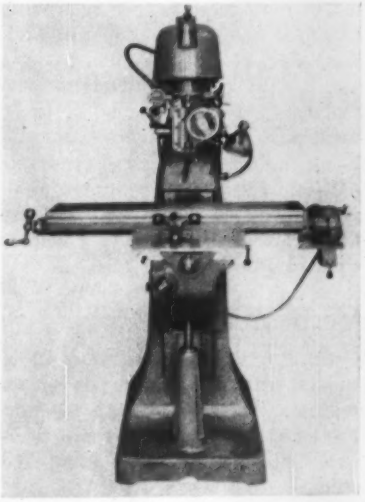
Equipped with a universal-joint head, the Cleveland Jr. multi-spindle drill tapper affords maximum flexibility in bolt circles or spindle arrangements. It will drill up to eight No. 25 holes or tap eight No. 10-32 holes within a maximum bolt circle of 8 in.



The head remains stationary while the table is raised to engage the tools and feed them into the work. The adjustable spring-balanced table compensates for variations in weight of work and fixtures and has a vertical travel range of 4 in. Cleveland Tapping Machine Co., Canton 6, O. (Amphitheatre Booth 4019)

Vertical Mill

This toolroom model has spindle speeds of 250 to 2850 rpm with a standard 1-hp, 1200 rpm motor. Drive is by B-section V-belt from six-step motor pulley to six-step spindle pulley.



Working surface of the table is 9½ x 36 in. Longitudinal feed is 24 in., cross feed is 9¾-in. The head has coarse and fine hand feed. Both knee and saddle have large micrometer dials graduated in 0.001 in. U. S. Burke Machine Tool Division, Cincinnati Mfg. Corp., Cincinnati 27, O. (Coliseum Booth 616)

Automatic Screw Machine

Equipped with electric feed drive, the 1⅝-in. Model "AB" Dialmatic provides separate, infinitely adjustable feeds, both forward and return, for each of the five turret positions.

After spindle speeds and feeds for each station have been determined, a chart on the control panel

Using the Sheffield-Cavitron Ultrasonic Machine Tool to dice germanium in the mass production of transistors. The tool itself consists of 271 pieces of Superior's 18-gage Type 304 needle tubing, cut to ⅞" lengths and silver brazed into a single tool, permitting tolerances as fine as .0005".

NEW ULTRASONIC MACHINE TOOL USES TUBING TO CUT HARDEST, MOST BRITTLE MATERIALS KNOWN

a new application for Superior Tubing

Ultrasonic vibrations do the cutting with this new machine tool, invented and developed by the Cavitron Equipment Corporation, Long Island City, N.Y. In the Cavitron process, a tool is used which has the precise shape of the cavity desired. Finely divided abrasive particles suspended in water are flowed continuously across the work. No movement or vibration is visible when the machine is switched on, although the tool tip vibrates 20,000 times a second through a stroke of .0035". The vibrating tip activates the suspended particles, and microscopic chips are gently excavated without heat, noise or vibration. The tool sinks swiftly into the work under slight pressure, forming a cut or cavity of exactly the same shape as the tip.

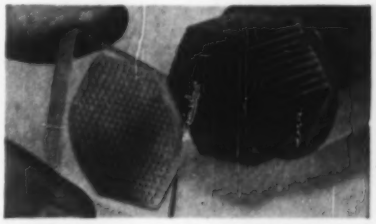
Tools made of Superior tubing save considerable cutting time on relatively large areas. Furthermore, the slender walls (.005" thick) minimize waste of valuable raw material. Cavitron engineers first used carbon tubing for this purpose, but in consultation with Superior engineers switched to AISI Type 304. This material has twice the life of carbon tubing, with much greater resistance to wear. Most important, it resists warping at the silver brazing temperatures needed to join the tubes together.

Your files should contain Superior Bulletin No. 40. It lists over 55 types of available material, including the stainless steels, with valuable selection and application data. Write for your free copy today. SUPERIOR TUBE COMPANY, 2005 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Co., 5710 Smithway St., Los Angeles 22, California.

All analyses available in .010" to ⅝" OD; certain analyses in light walls up to 2½" OD

Superior Tube
The big name in small tubing

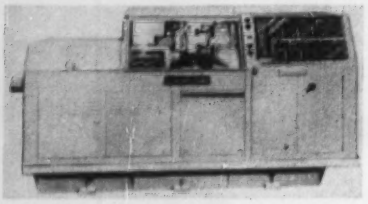
Superior tubes are cut into 2" lengths and silver brazed into a 6-sided tool, which is then cut in half and two complete honeycomblike tools formed—each ⅞" deep. Similar tools are used to cut precision jewel bearings.



Closeup of tool and work shown in top picture. The Cavitron makes it possible to cut and drill intricate shapes in materials which, because of their frangibility or sensitivity to sudden temperature changes, would be impossible to work on a production basis.

quickly transposes these figures into dial settings.

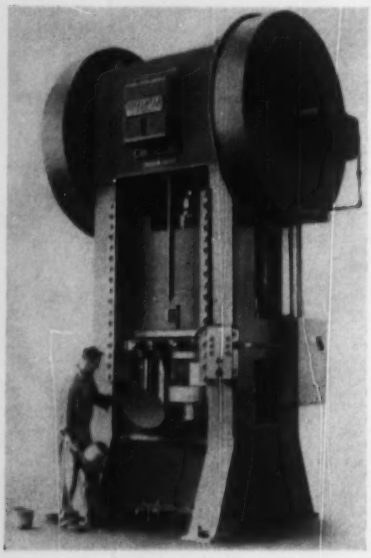
Spindle speeds range from 40 to 3200 rpm. Drive is electric. Speeds can be preselected forward



or reverse in any combination for the five turret positions. Cleveland Automatic Machine Co., Cincinnati 12, O. (Amphitheatre Booth 412)

Deep-Draw Press

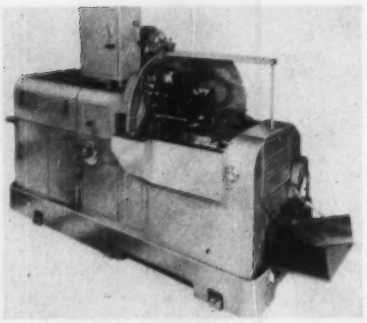
Designed for high-production work, the Hi-Draw press is rated at 215 tons. The nonwork portion of the ram stroke is fast. A linkage provides quick approach, quick



return and slow constant velocity through the drawing range. Steelweld Machinery Division, Cleveland Crane & Engineering Co., Wickliffe, O. (Amphitheatre Booth 1418)

Automatic Turret Lathe

New cycle timing drum of the 4¾-in. Model MR single-spindle, bar-type machine provides: Automatic control of six predetermined spindle speed changes, three selected



feed ranges and spindle reversing during the cycle.

Also shown will be the 4-in., Acme-Gridley eight-spindle bar automatic. National Acme Co., Cleveland 8, O. (Amphitheatre Booth 705)

Sawing Machine

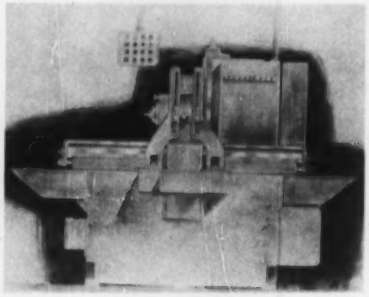
The standard 10 x 10-in. metal cutting saw has an extra wide overarm to hold the frame in true alignment and insure accurate cutting. Large slide bearings in the overarm give long life.

The heavy U-type frame enables proper blade tensioning for fast, accurate work. Sturdy saw frame bearing shoes are replaceable. Hardened and ground for long life, they are adjustable for wear.

A large table with T-slots provides adequate space for all general-purpose work. The coolant trough is cast integral with the table. The heavy-duty vise clamps work from 90 to 45 degrees. Its movable jaw adjusts automatically to the work. Peerless Machine Co., Racine, Wis. (Amphitheatre Booth 322)

Hydraulic Mill

The 5-hp Cl Rigidmil has a 10½ x 58-in. table and maximum stroke of 24 in. Feed range is 1 to 100 ipm, with rapid traverse of 350 ipm. The spindle head is a self-



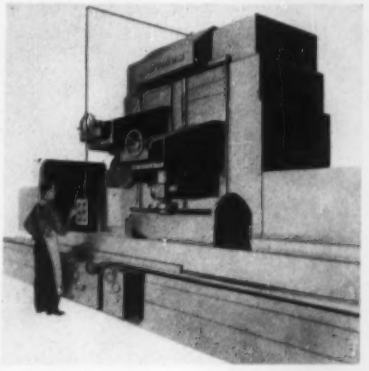
contained unit with independent motor drive. Standard speeds are 50 to 1500 rpm.

The head is carried on a movable column, so that the spindle nose can be positioned from 5 to 11¾-in. from the center of the table.

The Model C3, mechanical feed Rigidmill, designed for heavy-duty milling, also will be shown. Sundstrand Machine Tool Co., Rockford, Ill. (Amphitheatre Booth 1412)

Surface and Way Grinder

Featuring independent vertical and horizontal spindle slides, this machine grinds large bed castings, columns, tables, slides, saddles and heads to precision tolerances. Flat and V-ways, dovetails, shoulders, edges, radii and contours can be ground in one setup. Independent spindles permit holding two or more surfaces in exact relative alignment.



A movable pendant lets the operator control all machine motion from any convenient position. Two-speed power traverse allows rapid positioning. A hydraulic wheel dresser is provided as standard equipment on the vertical spindle. Mattison Machine Works, Rockford, Ill. (Amphitheatre Booth 1422)

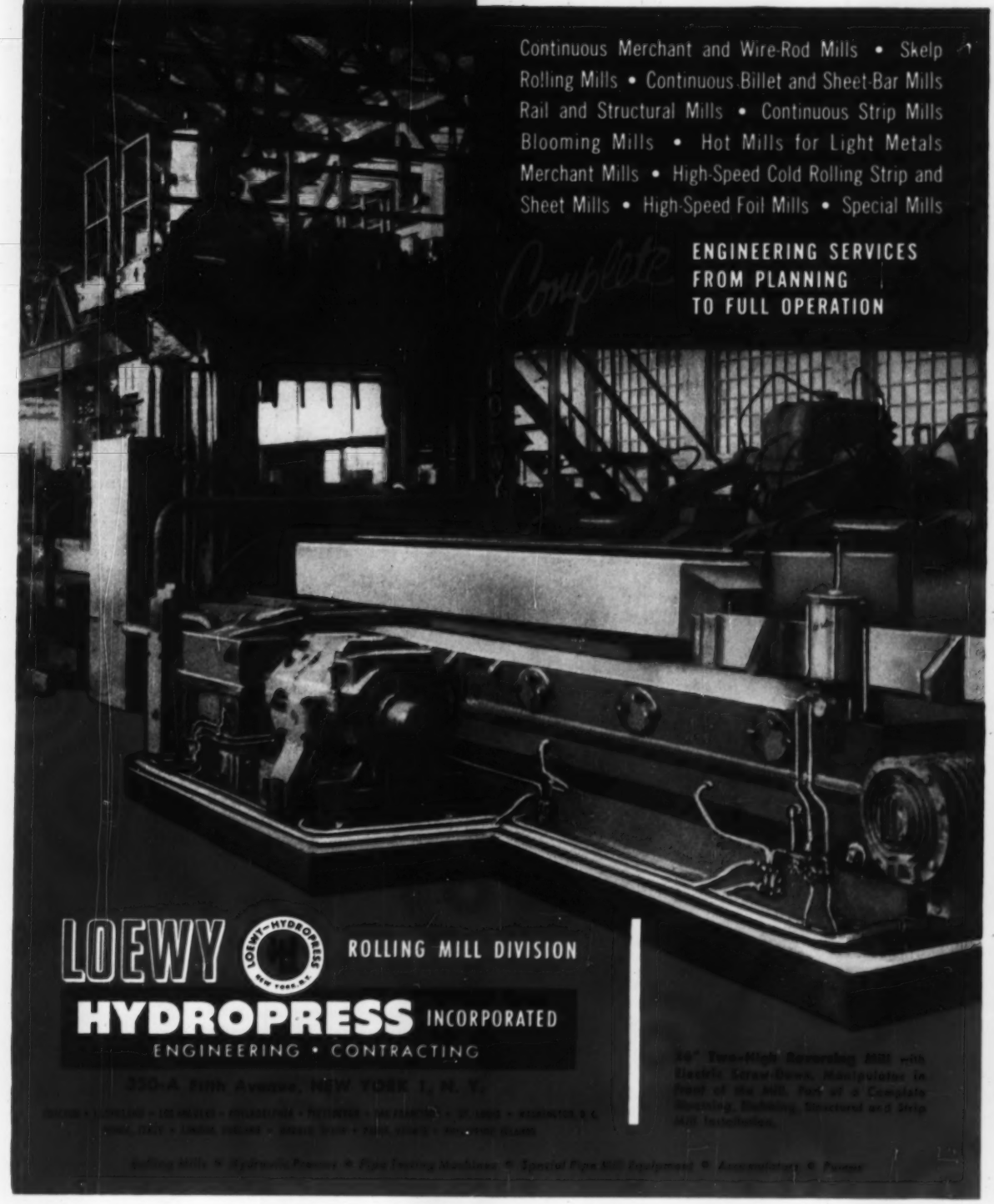
Turret Punch Press

Complicated hole patterns, including openings of many sizes and shapes, can be located and punched at high speed with this automatic press. The operator merely loads the material and unloads the finished work.

The press and work locating table are controlled by a tape-fed programming unit to perform all

LOEWY ROLLING MILLS

AND ROLLING MILL EQUIPMENT FOR
STEEL, LIGHT METALS, COPPER AND BRASS



Continuous Merchant and Wire-Rod Mills • Skelp Rolling Mills • Continuous Billet and Sheet-Bar Mills Rail and Structural Mills • Continuous Strip Mills Blooming Mills • Hot Mills for Light Metals Merchant Mills • High-Speed Cold Rolling Strip and Sheet Mills • High-Speed Foil Mills • Special Mills

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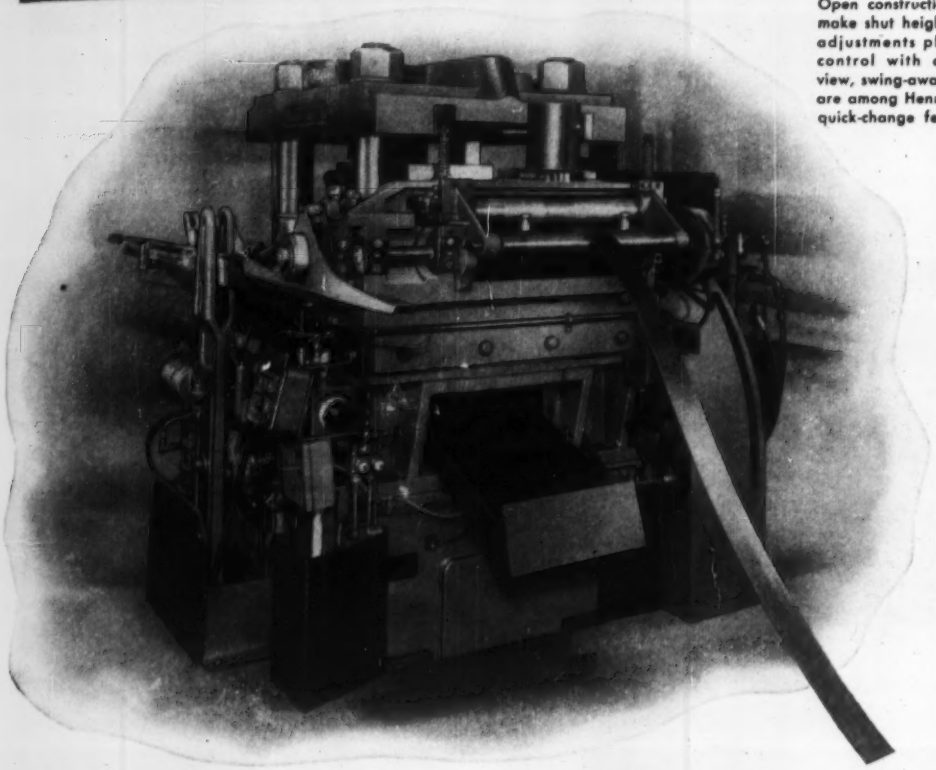
Two to three die changes a day

HENRY & WRIGHTS COMBINE HIGH SPEED OPERATION WITH HIGH SPEED JOB CHANGE



Open construction, easy-to-make shut height and feed adjustments plus inching control with die in full view, swing-away roll feeds are among Henry & Wright quick-change features.

As many as two to three job changes in a day are being made by companies taking advantage of the quick-change features of Henry & Wrights. These companies report sharply reduced costs on short runs. A contract plant said it had greatly improved its competitive cost situation and was re-bidding on jobs previously lost.

Their unique quick-change features are just some of the reasons why Henry & Wrights rate preference in modernization programs. Other advantages are high speed with minimum vibration, precise alignment of punch and die, quick-stop pneumatic clutch, overall rigidity—and the assurance of longer die life.

Only the best is good enough

You owe it to yourself to get the complete story about Henry & Wrights and how they can improve your stamping methods. Our representative will be glad to give you the details.

HENRY & WRIGHT

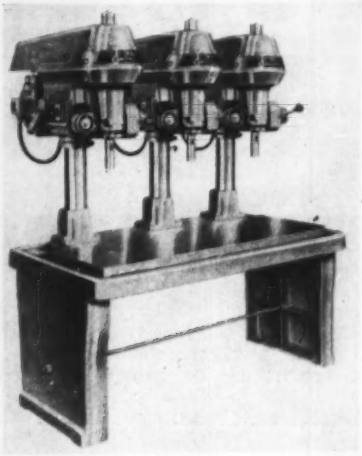
DIVISION OF EMHART MFG. CO.

441 WINDSOR STREET, HARTFORD, CONNECTICUT

functions automatically. It positions the work under the punch, selects the turret station carrying proper punch and die (any 1 of 20 up to 6-in. square) and trips the press. This is automatically repeated until all holes are located and punched. Wiedemann Machine Co., Philadelphia 32, Pa. (Amphitheatre Booth 1420)

General-Purpose Drill

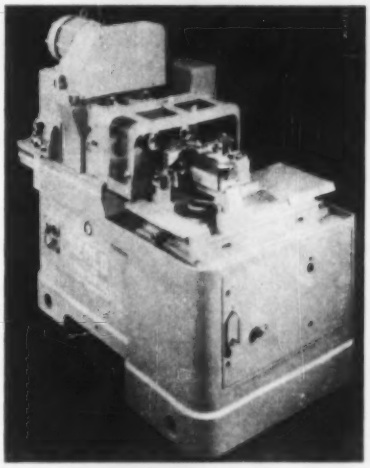
The 18-in. Royal Model LE is for production, toolroom, maintenance and general-purpose duty. It is rated at 1-in. capacity in cast iron with a 1-hp motor. A V-belt drive transmits motor power directly to the six-splined spindle.



Six spindle speeds are provided, ranging from 390 to 3100 rpm with an 1800 rpm motor; 324 to 2580 with a 1500 rpm motor; 259 to 2060 with a 1200 rpm motor; and 216 to 1715 with a 1000 rpm motor. Machines are available in single-spindle floor models, single and multiple-spindle production bench models. Also on display will be models of the 16-in. Royal drilling machine. Cincinnati Lathe & Tool Co., Cincinnati 9, O. (Amphitheatre Booth 309)

Bore-Matics

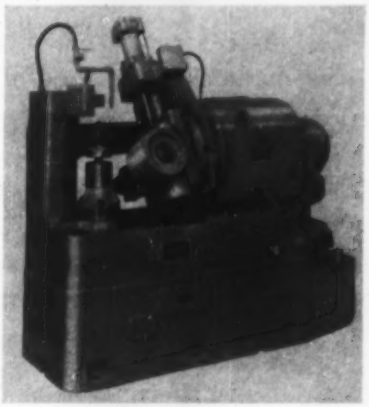
Constructed with rigid bases and hardened steel box-type ways, the 2215 (shown) and 3215 horizontal models are designed for continuous high production of a single part. Ways are under constant pressure lubrication. A hydraulic gib maintains accurate alignment and functions as an automatic take up for wear.



Cycle speeds can be changed within wide limits. Any combination of straight, taper or contour boring, turning, facing or grooving can be done. Rapid traverse stroke is 10 in. on the 2215, 13 in. on the 3215. Boring stroke is 4 in.; cross slide stroke 3 in. Heald Machine Co., Worcester 6, Mass. (Amphitheatre Booth 902)

Helical Gear Hobber

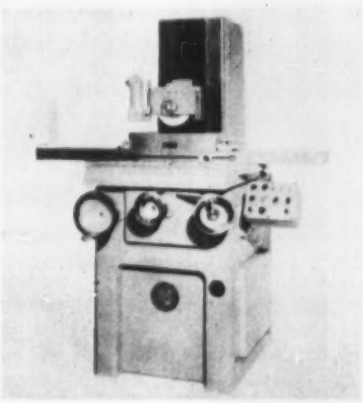
A high-production machine, the 10HQ HoBlique feeds the hob tangent to the helix of the gear being cut in either of two cutting cycles: A trilineal cycle provides two successive fast enter feeds at different rates, followed by the hobbing feed. A quadricycle has a fast enter infeed, followed by the hobbing feed.



Tangent feeding makes a lead screw unnecessary. No differential or lead cam is needed. Hob wear is distributed over the tool length. The oblique feed results in shorter hob travel. It, plus fast enter feed and high hob speeds, gives optimum production. Gould & Eberhardt Inc., Irvington 11, N. J. (Amphitheatre Booth 1424)

Pushbutton Grinder

The Reid-O-Matic, model 618-PF is an electric-powered, automatic 6 x 18-in. surface grinder for the production line or the toolroom. Power rapid traverse of the crossfeed, elevating head and automatic cycle of the crossfeed are pushbutton controlled.



Dial-controlled speed of the table is variable from 0 to 70 fpm. Table reversal is done without reversing the driving motor. Crossfeed drive is dial controlled from 0.0001 to 7/32-in. A selector switch controls crossfeed at either or both ends of the table travel. Reid Bros. Co. Inc., Beverly, Mass. (Amphitheatre Booth 108)

Box Column Drill

Equipped with a 2-hp motor and No. 4 M.T. spindle, the model 8-30 will drill up to 1¾-in. in cast iron. The geared head has eight spindle speeds—95 to 1200 rpm—any of which can be selected while the machine is running. The spindle is equipped with an automatic drill ejector. Quill travels 6 in.

T-slots and a coolant trough are provided on the 20 x 28-in. machined table. The table assembly is supported on a large diameter Acme elevating screw and hardened and ground dovetail. The 15

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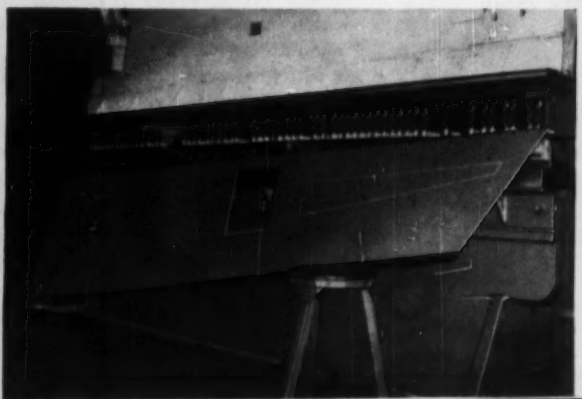
This free service includes a complete analysis of your sheet metal fabricating operations by Wales competent and experienced engineers. By analyzing your present or future parts production, Wales engineers provide you with an evaluation study of your present costs compared with Wales methods and tooling.

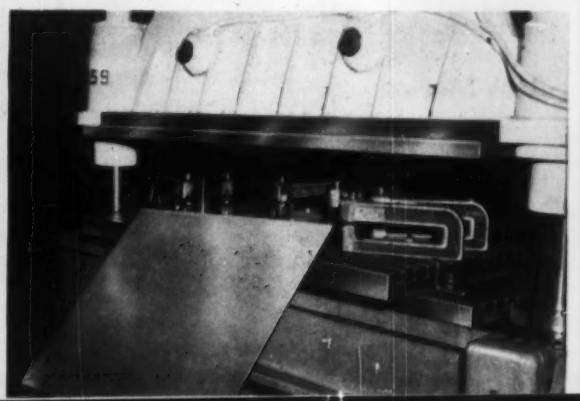
The astounding savings illustrated and described below, from one of many plants in the United States and Canada where the Wales Application Engineers have gone into operations, are typical of the huge savings made possible by Wales Production Method of hole punching and notching.

NO OBLIGATION, OF COURSE!

Typical of the many setups of the independent self-contained Wales Type "C" Hole Punching Units in a press brake at Canadair which produced in one year **SAVINGS OF APPROXIMATELY 46,000 HOURS.**



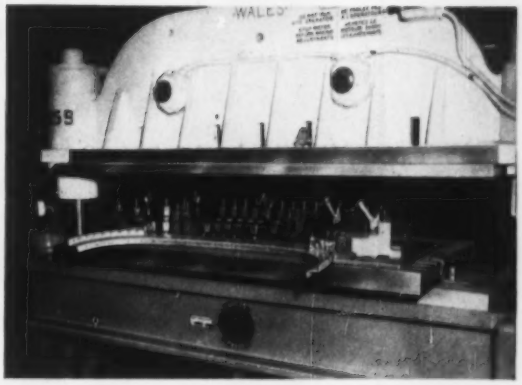
One of the many setups of Wales Type "BL" Hole Punching Units which are used and reused in unlimited hole patterns at Canadair producing in one year **SAVINGS OF APPROXIMATELY 12,000 HOURS.**



What WALES Metal Working Equipment has done for Canadair OF MONTREAL, LIMITED

In the "Wales Department", as this section of the Canadair plant is commonly called, where these time studies, savings and photographs were made is a very efficient and cost-conscious department which, due to continuous efforts, have improved on cost savings submitted in the original Wales analysis. Actual operations, after the purchase of the Wales tooling and equipment, showed the survey figures on the conservative side.

Production savings produced by Wales tooling and equipment made the initial purchase costs a relatively small item.



A setup of Wales "H" Hole Punching Units in a Wales Twin Column Press for horizontal punching of flanges at Canadair which produced **SAVINGS OF APPROXIMATELY 4,000 HOURS.**

Three Wales Fabricators with "Quick Change" punches and dies which provide unusual time-saving and money-saving advantages at Canadair.

HOW TO PUT THE WALES APPLICATION ENGINEERS TO WORK FOR YOU

Wales Application Engineers stand ready to make a complete evaluation of your sheet metal operations. Just call or write TODAY for an appointment at your convenience.

WALES-STRIPPIT CORPORATION

George F. Wales, *Chairman*

585 Payne Avenue, North Tonawanda, N. Y.

(Between Buffalo and Niagara Falls)

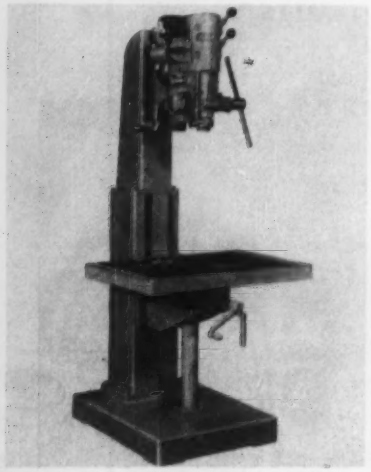
Specialists in Punching and Notching Equipment

Stocking bins and setup table for Wales Units at Canadair. Note setups are made outside the press and when placed in press are ready to operate with the first stroke of the ram.

Three setups of Wales Units in a press brake punching three different parts at the same time reducing press time by two-thirds. Note nothing is attached to press ram. Punches and dies are automatically aligned by self-contained Wales Units.

in. from spindle to column gives 30 in. of swing. Maximum distance between spindle nose and table is 28 in.

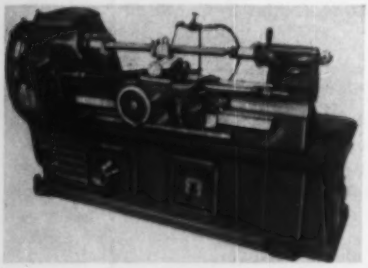
Also on display will be a radial drill designed for workpieces or fixtures too large to conveniently move or slide into position on the



table, but where the job does not warrant investment in a large, conventional radial drill. I. O. Johansson Co., Skokie, Ill. (Coliseum Booth 320)

Threading Lathe

This single-point machine is capable of cutting 30 in. of stock 2 in. in diameter (four threads per inch) in 2½-minutes. Capacity is 30 in. of thread length, and it will swing up to 12-in. diameters. It cuts internal and external threads, both right and left handed, taper and multiple start.



The operator has only to load, unload and start the automatic cycle. The machine is set for up to 100 passes per minute, and includes a diminishing feed per pass for roughing and finishing during the cycle. Average setup, including change of pitch, change of diameter, length of thread, etc., takes 10 minutes. Tool changes require less than 1 minute. Working speeds range up to 2000 rpm. Man-Au-Cycle Corp. of America, Brooklyn 32, N. Y. (Coliseum Booth 211)

All-Steel Shaper

This 42-in. machine features an all-steel welded and stress-relieved frame and a triangular, Corten ram, hooded for maximum stiffness. The unit has 16 cutting speeds, 25 to 400 fpm. Speed selection is by dial while machine is idle or in motion.

The shaper has a full helical, constant mesh transmission with hydraulically operated clutches. A single lever control from either side of the machine gives instantaneous reverse at any point in the stroke.

Other features: Pressure lubri-

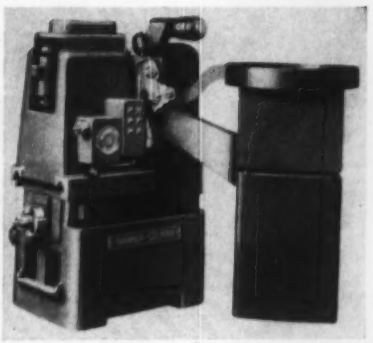
cated phenolic ways; automatic tool lifter, no tool drag; five angular feeds with rotating table for shaping at any angle; horizontal and vertical power rapid traverse. Cincinnati Shaper Co., Cincinnati 25, O. (Amphitheatre Booth 1105)

Vertical Hobbing Unit

For automatic operation the No. 3-6 has standard basic units with tooling, loading, gaging and handling designed to suit requirements of each part. The machine shown is equipped with a vibratory hopper loading device.

The automatic hob shifter is a part of the cycling mechanism. It can be set to shift after each cycle, or it can be arranged to shift after a number of parts have been cut. The hob slide is operated pneumatically.

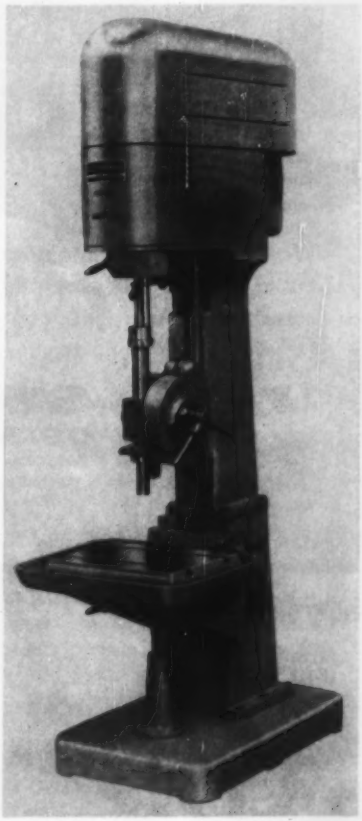
The 3-6 is for high-speed produc-



tion of spur and helical gears. Large V-type bedways are heat treated and ground, and the entire unit is heavy and rigid. Barber-Colman Co., Rockford, Ill. (Amphitheatre Booth 1322)

Drilling, Tapping Machine

For continuous, heavy - duty work, the Model 4F (shown) features variable speeds to 2200 rpm and a capacity in cast iron of 1½-in. The machine has a 12-in. overhang with pedestal.



The Model IF is for light precision work. It features a variable speed drive, with instant selection

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...AND YOU'LL SEE WHY

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Feature for feature, *you* can compare Danly presses with all others and see why far-sighted, progressive management prefers Danly. Such point-by-point, feature-for-feature comparison is exactly what one of the world's largest builders of autos and trucks made. Result? They bought and installed Danly Presses in their new production lines.

Now, after more than two years of continuous, high-speed production, these presses have "proved out" with a truly outstanding performance record. First, they have been charged with *only four man days* for other than routine maintenance. During this same period, *shift production averages have been consistently higher* for long, continuous runs. The cost advantage and over-all output gain is obvious.

Other indirect benefits were noted, too. *Installation* of all the presses was completed without overhaul or major adjustment. Also, the dependability of the Danly Presses made it unnecessary to maintain costly stocks of press spare parts – an important cost saving in itself.

Danly Presses will "prove out" in your plant the same way. Use the check list shown now . . . make your own comparison and see why Danly Presses will give you increased production at lower cost.

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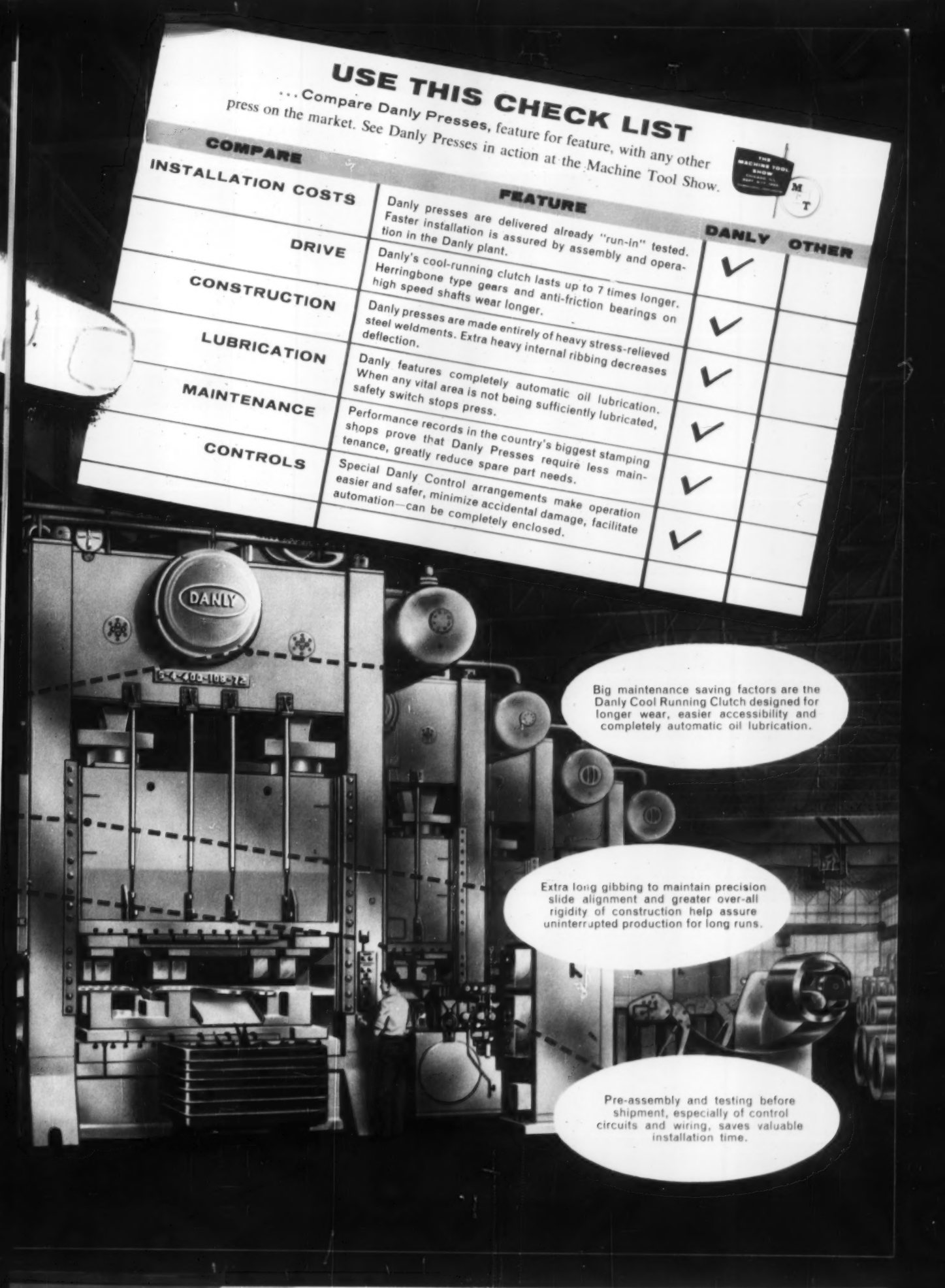
DANLY

USE THIS CHECK LIST

...Compare Danly Presses, feature for feature, with any other press on the market. See Danly Presses in action at the Machine Tool Show.

COMPARE	FEATURE	DANLY	OTHER
INSTALLATION COSTS	Danly presses are delivered already "run-in" tested. Faster installation is assured by assembly and operation in the Danly plant.	✓	
DRIVE	Danly's cool-running clutch lasts up to 7 times longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.	✓	
CONSTRUCTION	Danly presses are made entirely of heavy stress-relieved steel weldments. Extra heavy internal ribbing decreases deflection.	✓	
LUBRICATION	Danly features completely automatic oil lubrication. When any vital area is not being sufficiently lubricated, safety switch stops press.	✓	
MAINTENANCE	Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.	✓	
CONTROLS	Special Danly Control arrangements make operation easier and safer, minimize accidental damage, facilitate automation—can be completely enclosed.	✓	


DANLY
Big maintenance saving factors are the Danly Cool Running Clutch designed for longer wear, easier accessibility and completely automatic oil lubrication.
Extra long gibbing to maintain precision slide alignment and greater over-all rigidity of construction help assure uninterrupted production for long runs.
Pre-assembly and testing before shipment, especially of control circuits and wiring, saves valuable installation time.

High Speed Production Grinding DEMANDS more than just a Coolant!

High speed production grinding has made just *coolants* obsolete! Today's water-mix grinding fluid must provide lubrication, heat dissipation qualities, anti-rust protection and balanced surface tension. If you're using *"just a coolant,"* it's costing you extra money!

Stuart's CODOL is a carefully designed liquid grinding compound that is *far more than just a coolant.* CODOL has been scientifically compounded to provide far more detergency than ordinary water-mix grinding fluids. Wheel loading is greatly reduced and allows more pieces to be ground per wheel dressing.

CODOL's carefully balanced surface tension insures the carrying away of chips and abrasive particles from the wheel, work and machine. Surface finish is improved, production is increased and good wheel life is obtained.

To be sure that you consider *all* of the important points, such as ease of mixing, resistance to rancidity, gumming and foaming, when selecting a water-mix grinding fluid, ask "the Man in the Barrel," your Stuart Representative, to call and help you. And write today for your copy of the Stuart Water-Mix Cutting and Grinding Fluid book.

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Stuart Oils

Time Tested Cutting Fluids and Lubricants

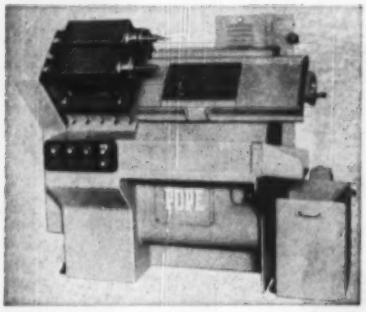
Plants in: Chicago, Detroit, Cleveland, Hartford, and Toronto, Ontario.

Branch Warehouses and Representatives in principal metal working centers in the United States, Canada and Europe.

between 1250 and 10,000 rpm. The unit has a prepositioned micrometer graduated depth gage and an adjustable spindle tension control. The machine has a 7-in. overhang and 3/8-in. capacity in cast iron. Edlund Machinery Co., Cortland, N. Y. (Amphitheatre Booth 115)

Multiple-Spindle Borer

The R-2 Super-Precision is a single-end machine with a 9-in. table stroke. It combines electrical control and mechanical-rotating operation. There are no cams, change gears, sprockets or linkages. Feeds and traverse rates are infinitely variable.



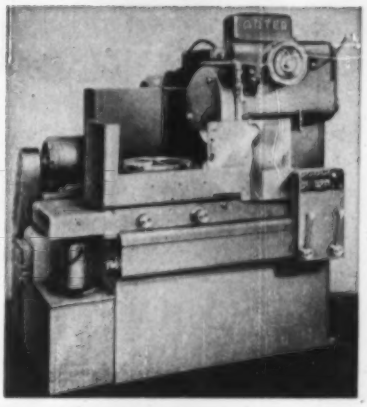
Other features: The electrical control system is housed in a separate cabinet, permitting quick accessibility. Table and bridge are set at a 45-degree angle to allow for rapid loading and unloading and free flow of coolant and chips. Table bearing surfaces are hard chrome plated. Stationary or table ways are never uncovered. Pope Machinery Corp., Haverhill, Mass. (Amphitheatre Booth 117)

Rotary Surface Grinder

Model E-16-in. machine is a vertical column grinder adaptable to automatic cycling. Its rectangular sliding table has a rotatable, magnetic chuck in 12 and 16-in. sizes.

Grinding is done by the periphery of a grinding wheel 16 in. in diameter. Flat, convex and concave surfaces can be finished. The wheel spindle is driven by V-belt from a 15-hp motor.

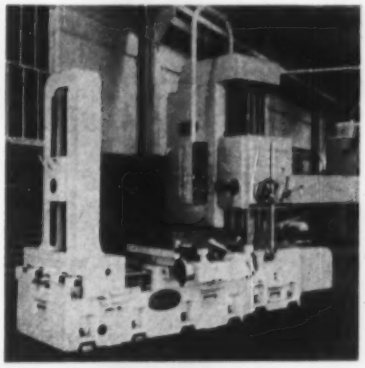
The table slide is hydraulically operated; reversals are controlled by microswitches. The wheelhead



can be moved vertically by handwheel or by power through a ground screw. Arter Grinding Machine Co., Worcester, Mass. (Amphitheatre Booth 1308)

Horizontal Mill

All functions of the Model 75 boring, milling and drilling machine are controlled by a movable pendant—feed and traverse of spindle, head, table and saddle; selection of speed rates; rotation of spindle and head binder; selection of feed rates in inches per minute per revolution of the spindle.



The spindle has both screw and rack feed, either of which can be selected by a switch on the head. Chromed, hardened ways are provided for the bed and saddle. This machine will be shown in 3 and 5-in. sizes. Bullard Co., Bridgeport, Conn. (Amphitheatre Booth 1213)

Production Mill

Speeds and feeds of this bed-type machine permit fast cycles and high production. Spindle speeds from 25 to 1230 rpm are obtained through change gears, with four speeds per set. Table feeds are 1 to 81 ipm through change gears. Rapid traverse of table is 243 ipm.

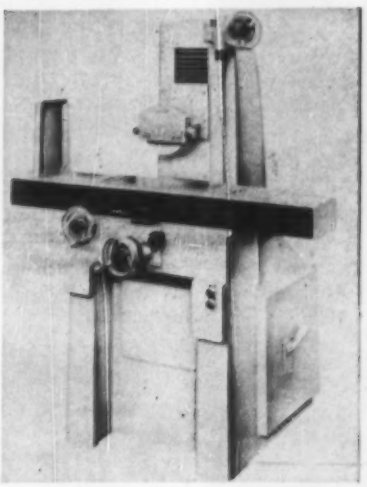
An involute spline on the spindle gives efficient power transmission to the spindle regardless of quill position. An electric brake clutch is mounted on the input shaft for automatic spindle stop. This also serves as a spindle lock for easy tool removal.

The counterweighted milling head has an alloyed iron overarm arbor support with locks, which lends rigidity to the cutters. Rigid overarm brace and arbor support insure arbor accuracy. Large, ground dovetail ways, properly gibbed, provide cutter accuracy. A pendant-mounted, pushbutton station gives the operator full access to controls.

Construction of the bed is ribbed-reinforced alloy iron with large coolant and chip compartments. The table has standard T-slots. Ways have nonmetallic liners with special lubrication and way wipers. Motch & Merryweather Machinery Co., Cleveland 13, O. (Amphitheatre Booth 606)

Surface Grinder

The 6 x 18 in., type-D, hand-feed machine is of antifriction construction throughout, including the table cross slide and elevation slide way bearings. Bearings are



hardened tool steel, precisely ground with contoured raceways. All bearings are preloaded to confine important slide movements to an accurate, straight plane. Each

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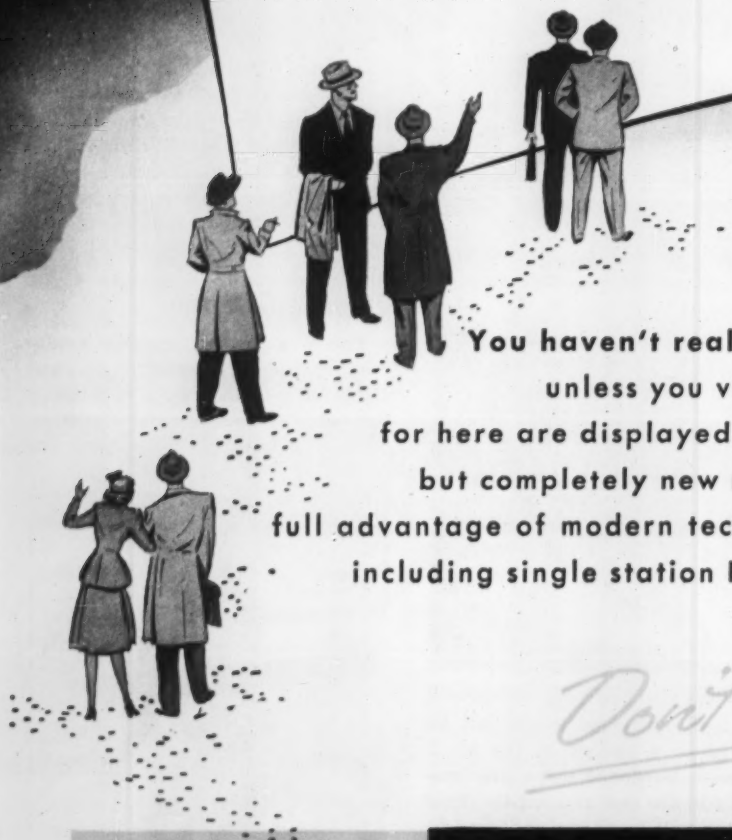

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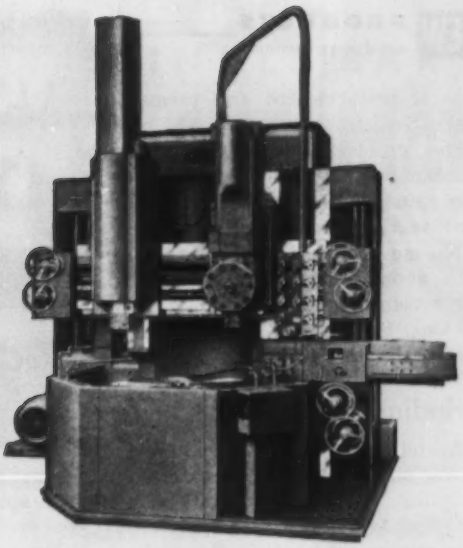
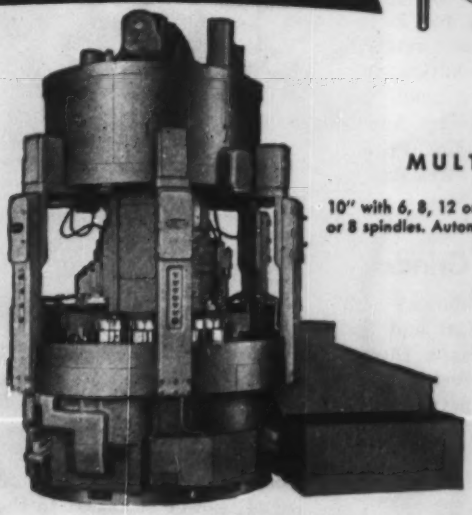
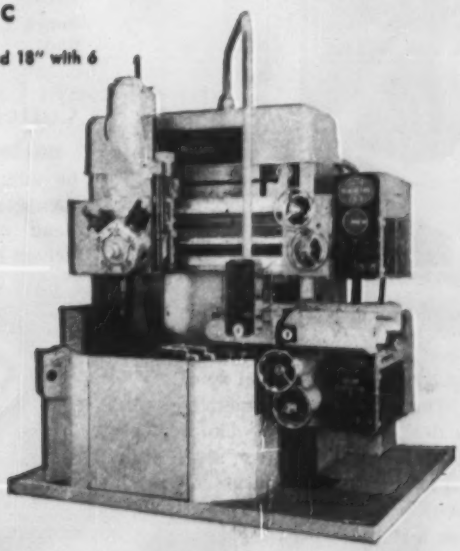


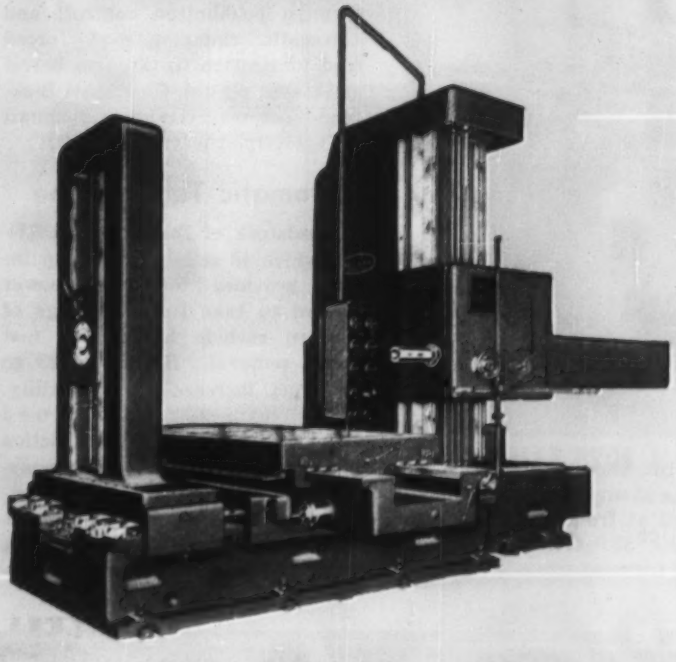
CUT MASTER V.T.L.
Model 75
In six sizes, 26" to 76" table diameters in 10" increments. Various combinations of heads are available.



MULT-AU-MATIC
Type "L"
10" with 6, 8, 12 or 16 spindles, 14" and 18" with 6 or 8 spindles. Automatic loader.



MAN-AU-TROL
Model 75
For fully automatic operation — may be applied to any or all heads of Cut Master V.T.L., Model 75 at time of ordering or in your plant at a later date.



HORIZONTAL BORING, MILLING and DRILLING MACHINE
Model 75
3" 4" and 5" spindle — Available in many combinations of bed lengths, vertical capacity and table size. Automatic positioning.

slide is prelubricated and permanently sealed.

The grinder is equipped with standard cartridge-type antifriction spindles. It can be arranged for vertical spindle operation. Table movement is by handwheel, with about 2 in. of table travel per revolution. Thompson Grinder Co., Springfield, O. (Amphitheatre Booth 1407)

Grinding Workhead

Model B943 is a self-contained power unit for internal or external grinding. It is held in position by two T-slots and can be mounted to any convenient spot on the table. The swivel base permits the unit to be turned to any angle.

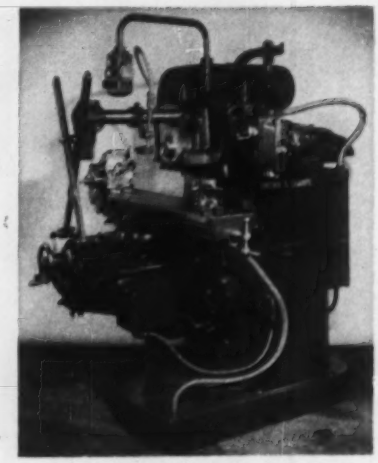
Standard spindle speeds are 150 and 250 rpm. Other pulley combinations allow any two specified speeds from 60 to 450 rpm.

The No. 11 B & S tapered spindle is designed to receive chucks, collet fixtures, face plates, straight or tapered sleeves and centers. K. O. Lee Co., Aberdeen, S. Dak. (Coliseum Booth 554)

Knee-Type Mills

The Rangemaster No. 20 universal and No. 20 plain machines are particularly useful where a part must be clamped and machined on many surfaces in different planes without disturbing the workpiece. Both horizontal spindle and universal head operate on a sliding head which is mounted on wide ways at the top of the column.

A 3-hp motor drives the spindles. Each spindle has 18



speeds, from 40 to 1530 for the main spindle, and from 80 to 3060 rpm for the universal head spindle. Eighteen feed rates, from ½ to 20¼-ipm are available for longitudinal, transverse or vertical feed of the table. In addition, the spindle of the universal head can be fed axially 3½-in. by hand. Brown & Sharpe Mfg. Co., Providence 1, R. I. (Amphitheatre Booth 520)

Cutter and Tool Grinder

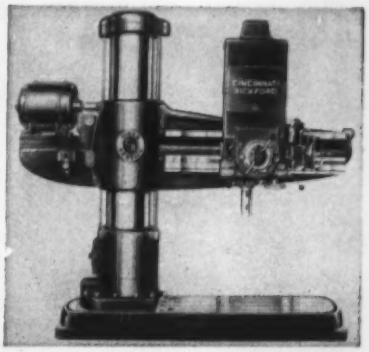
No. 12-A machine (shown) can be adapted to cylindrical and internal grinding. It has a tilting head with a 1-hp direct motor-driven spindle. Quick action swiv-

el and tilt clamps are provided. Operating controls are conveniently located at front and rear.

The No. 32 universal and tool grinder features fine transverse and longitudinal feed for circular form toolwork. Electronic speed control for table and headstock is infinitely variable. A 1½-hp motor drives the spindle through a timing belt. The unit will swing work 12 x 30 in. between headstock and right-hand tailstock. Covel Mfg. Co., Benton Harbor, Mich. (Amphitheatre Booth 720)

Radial Drilling Machine

This Super Service model features a hydraulic preselector for four spindle speed ranges. Each range has nine different spindle speeds which are changed by mechanical lever. The 18 rates of power feed also are changed by levers.



Other features: An optional hydraulic power head clamp; improved spindle mounting; electric traverse to the head, with a positive safety to protect head from damage at either extreme of arm travel; power elevation to the arm through pushbutton control; and automatic clamping and forced feed lubrication to the arm barrel and elevating nut. Cincinnati Bickford Tool Co., Oakley, Cincinnati 9, O. (Amphitheatre Booth 901)

Automatic Turret Lathe

Headstock of the Model 6-DRE-40, which is capable of 40-hp input, provides the extra power needed to take full advantage of modern carbide tooling for fast metal removal. Speeds of 23 to 470 rpm increase job versatility. Speed changes are obtained through multiple-disc friction clutches controlled electropneumatically.

Pushbutton control of spindle and slides insures faster setup. A new control drum makes change-

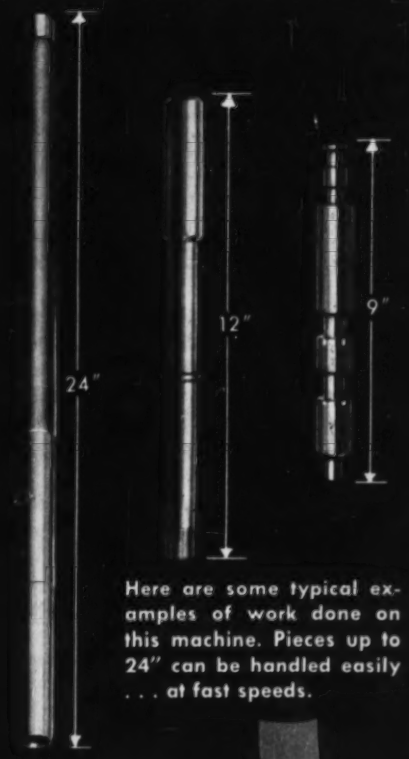
at the Machine Tool Show...Booth 1221

SEE THE GREENLEE SIX-SPINDLE BAR

AIR-FEED AUTOMATIC

OPERATING WITH

Air-Feed Stock Reel . . .
Lead Screw Threading . . .
Thread Rolling . . .
and a complement of standard tooling attachments.



Here are some typical examples of work done on this machine. Pieces up to 24" can be handled easily . . . at fast speeds.

THE MACHINE TOOL SHOW
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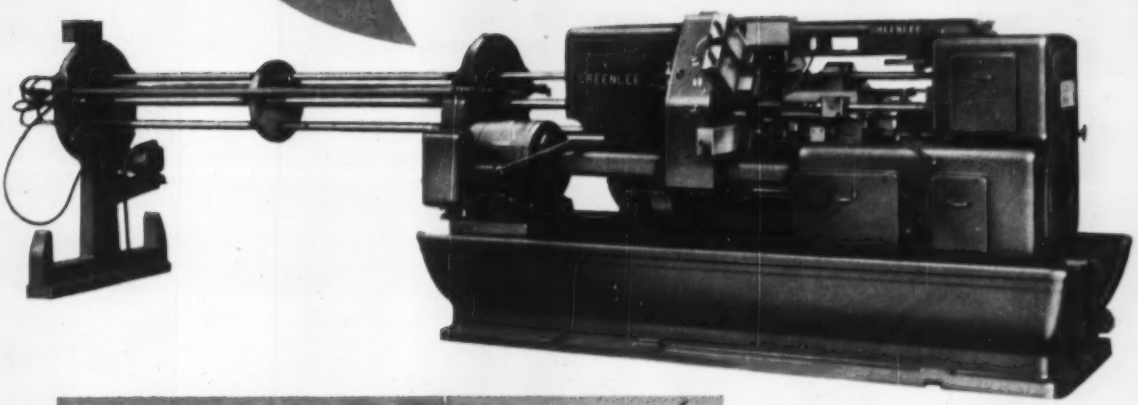
The air-feed machine can be modified to handle long parts as shown at left.



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PRODUCTION MACHINERY

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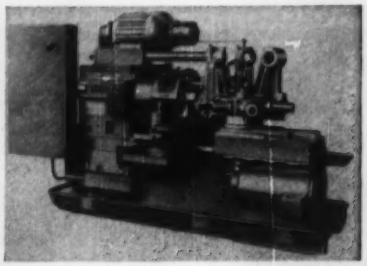
NEW PRODUCTS and equipment



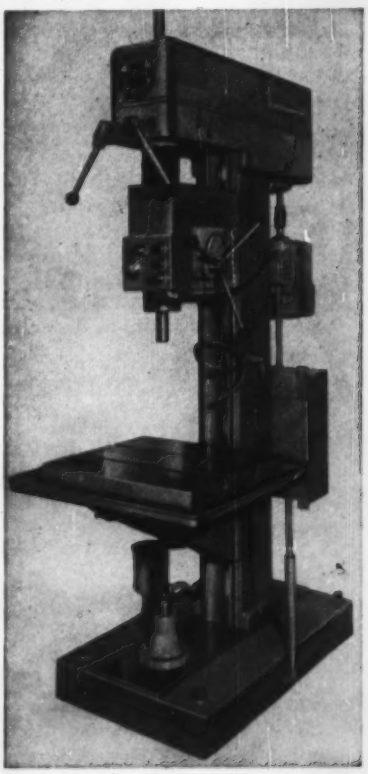
over easier and quicker, and provides automatic control of machine functions.

The standard turret has six faces. Turret slide moves on base ways of laminated construction. Bearing surfaces are of tool steel. Potter & Johnston Co., Pawtucket, R. I. (Amphitheatre Booth 1219)

Heavy-Duty Drill

The ⅞-in. UB machine has a four-speed geared transmission and back gears to provide eight speeds, 251 to 2900. With selection of V-belt drive, sheave speed ranges from 58 to 4350.

The unit has a sliding head with 7-in. travel and a standard spindle



Wherever you look AT THE MACHINE TOOL SHOW YOU'LL FIND

BLISS
E. W. Bliss Company
BOOTH #1414

BRYANT
Bryant Chucking Grinder Company — BOOTH #1015

CMC CLEARING USI
Clearing Machine Corp.
BOOTH #716

CLEVELAND
The Cleveland Automatic Machine Co. — BOOTH #412

CONSOLIDATED MACHINE TOOLS
Consolidated Machine Tool Co. — BOOTH #217

EDLUND
Edlund Machine Co.
BOOTH #115

famco
Famco Machine Company
BOOTH #507

FEDERAL PRESS
Federal Press Company
BOOTH #801

FOSDICK
The Fosdick Machine Tool Co.
BOOTH #1402

FOX
Fox Engineering Company
BOOTH #419

GALLMEYER & LIVINGSTON
Gallmeyer & Livingston Company — BOOTH #906

GREAVES
Greaves Machine Tool Co.
BOOTH #721

speeds installation of any machinery protects accuracy of precision machines

These machine tool builders cut set-up time at the Machine Tool Show from hours to minutes with BARRYMOUNT® Leveling Isolators. No drilling floors, no setting lag bolts, no shimming — they just set their machines on the Barry mounts, adjusted the leveling screws, and the normally tedious, costly job was done.

This is not just a show trick — it's a standard efficiency procedure for new installations and re-installations in large and small plants all over the country. And, *at the show or in your plant,* the isolation built into Barry mounts protects precision machines against vibration from nearby heavy equipment.

Visit us at Booth 153, Production Engineering Show, and a Barry engineer will show you how *you* can simplify installation, protect machine accuracy, prolong machine life, and cut maintenance costs with Barry Machine Mounts.

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PRECISION PRODUCTION THROUGH MICROMATIC
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MOLINE
Moline Tool Company
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Monarch TURNING MACHINES
The Monarch Machine Tool Co.
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THE MOTCH & MERRYWEATHER MACHINERY CO
The Motch & Merryweather Machinery Co.—BOOTH #606

Onsrud
Onsrud Machine Works Inc.
BOOTH #812

RACINE
Racine Hydraulics & Machinery Inc.
BOOTH #102

SHEFFIELD
The Sheffield Corporation
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Van Norman
Van Norman Company
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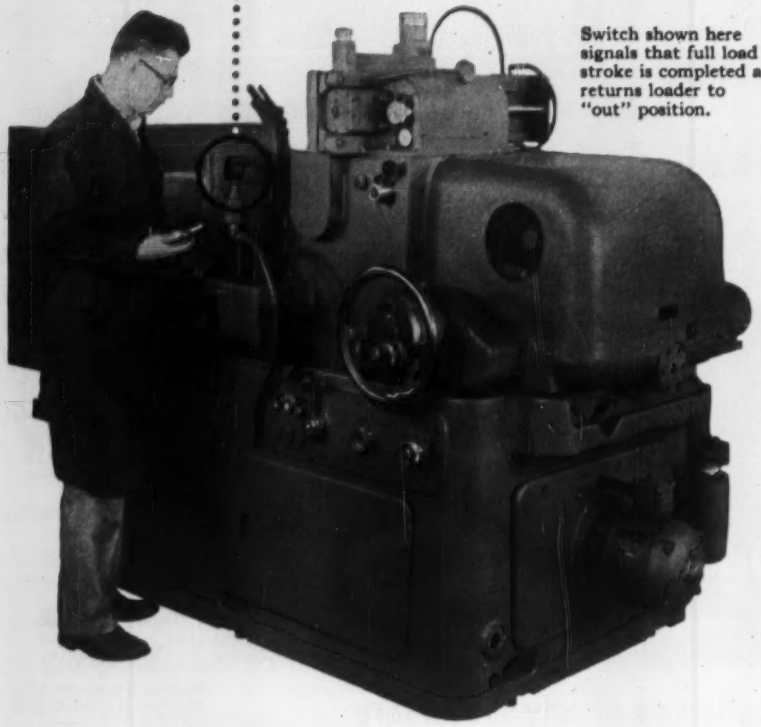
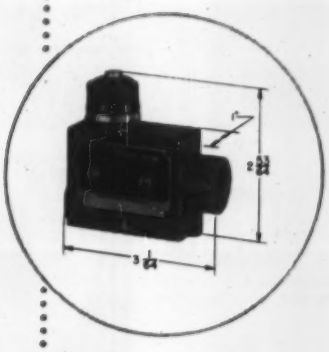
BOOTH #1420

MICRO SWITCH Precision Switches
A PRINCIPLE OF GOOD DESIGN

3 SWITCHES help this Landis Grinder precision grind 380 piston assemblies an hour



Switch shown here signals that full load stroke is completed and returns loader to "out" position.



This switch signals that the loader has withdrawn and starts grinding wheel head into position.

Switch signals that finished part has been ejected and starts loader on "load" stroke.

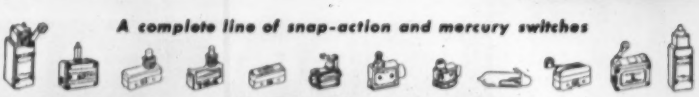
MICRO SWITCH products were selected by engineers of the Landis Tool Company to perform important automatic functions of this No. 12 Centerless Grinding Machine.

● The switches signal and control the various steps of the loading and unloading cycle. Landis engineers selected the dependable MICRO SWITCH precision units for this rugged day-in, day-out service because:

1 MICRO SWITCH provides widest selection of oil-tight switches of this type.
2 MICRO SWITCH national distribution makes easy switch replacement possible.
3 MICRO SWITCH field engineering service is quickly available.

For almost two decades, manufacturers of high quality machinery, electronic devices and instruments have found MICRO SWITCH engineering assistance the quick, practical and economical answer to switching problems. "MICRO SWITCH, Freeport, Illinois" is the sterling mark of quality on precision switches. Call your nearest MICRO SWITCH branch for consultation and advice without obligation.

A complete line of snap-action and mercury switches



MICRO SWITCH provides a complete line of extremely reliable, small-size, high-capacity, snap-action precision switches and mercury switches. Available in a wide variety of sizes, shapes, weights, actuators and electrical characteristics. For all types of electrical controls.

MICRO SWITCH
A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

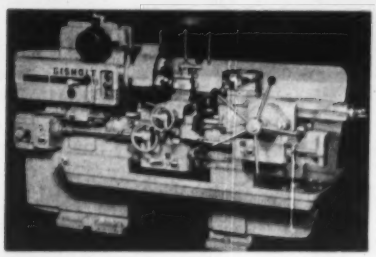
stroke of 7 in. Other features include a direct-reading dial for depth selection, electrically controlled feed engagement and convenient controls.

Model 64, a ¾-in. capacity hydraulic drill with two rates of feed and rapid approach, also will be on display. Barnes Drill Co., Rockford, Ill. (Amphitheatre Booth 818)

Ram-Type Turret Lathes

No. 3 Electram features the Gisholt-Weatherhead chuck, which power indexes the workpiece without stopping the spindle.

No. 4 Ram (shown) has hydraulically operated bar feed and collet chuck.

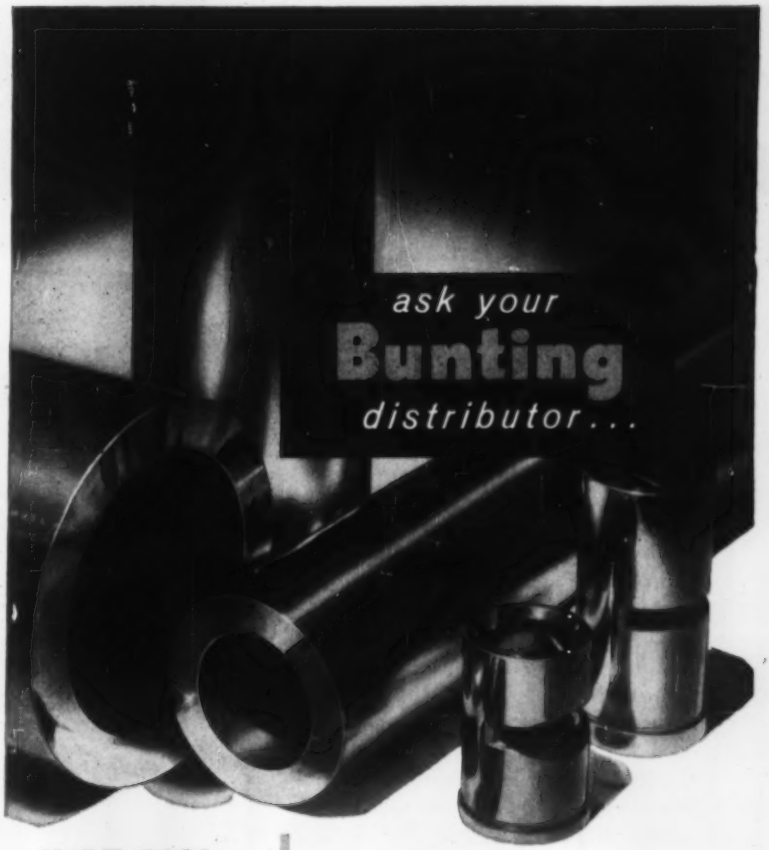


No. 5 Ram features the Gisholt hydraulic pressure tracer unit (the Jetracer) mounted on the rear of the cross slide. Gisholt Machine Co., Madison 10, Wis. (Amphitheatre Booth 1413)

Manufacturing Lathe

Designed for quantity production, the model 21 Mona-Matic features a four-cut automatic work cycle. Programming control is provided by a special cam stack which regulates the cutting tools,

carriage feed and traverse, the rear slide and the air gage tracer. Change of setup is done by installing a new cam stack in the



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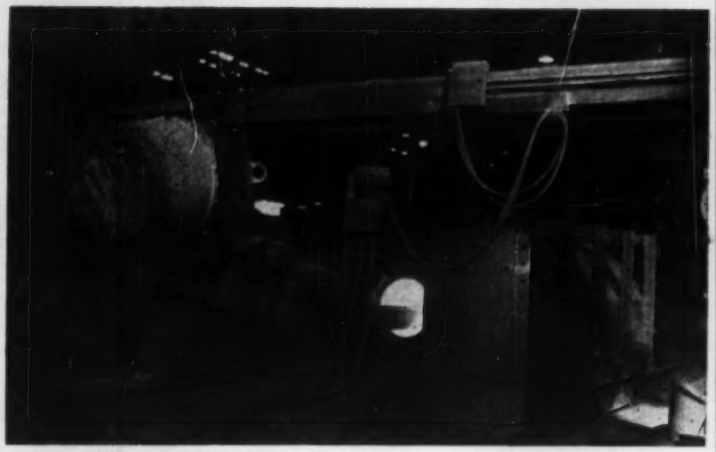
Manufacturers seeking to combine highest quality with utmost economy are turning to ACIPCO for their tubular steel products. One reason is the better and more complete service made possible by ACIPCO's modern integrated operations for production of centrifugally spun steel tubes.

Located "under one roof," ACIPCO facilities for casting, heat treating, machining, fabricating, and testing provide prompt service for steel tube users... and save both time and money.

If you use steel tubes — for rolls, hydraulic cylinders, shafts or other applications — investigate the extra economy, high quality and exceptional service offered by ACIPCO.

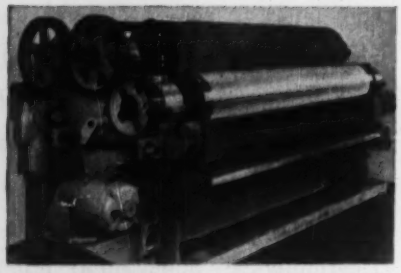
Consultation with ACIPCO's experienced engineers and metallurgists is quickly arranged at no cost or obligation.



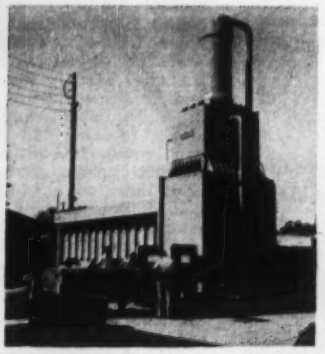
Casting

ACIPCO electric furnace steel, produced in the exact analysis to meet necessary chemical and physical property requirements, is centrifugally spun to required tube diameters in ACIPCO's versatile foundry facilities.

ACIPCO PRODUCTS



ACIPCO steel tubes possess excellent qualities of dimensional stability and dynamic balance. They offer exceptional service as paper mill, printing, engraving and many other types of rolls.



Many types of hydraulic cylinders in industrial presses and other machinery are being fabricated using ACIPCO steel tubes. ACIPCO tubes are especially suited for this application because of their non-directional mechanical properties.

ACIPCO steel tubes meet rigid government specifications for ship shafting and other tubular parts. In similar applications, they serve equally as well as industrial drive shafting of all types.

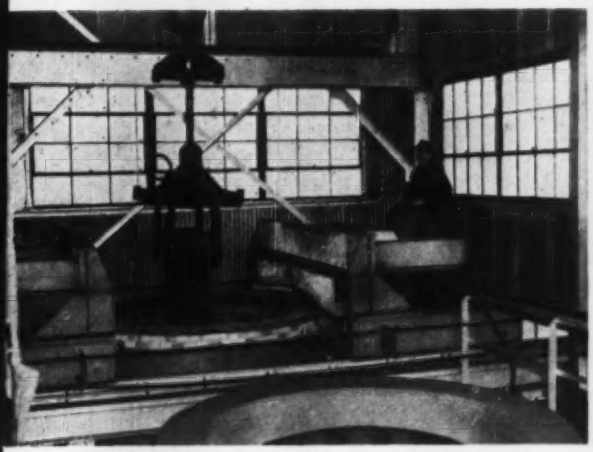
Consult ACIPCO on your TUBULAR PRODUCT needs!

AMERICAN CAST IRON PIPE CO.

Special Products Division

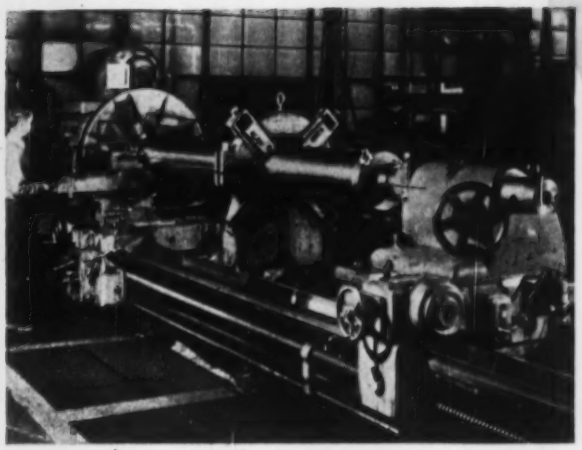
BIRMINGHAM 2, ALABAMA

Centrifugally Spun STEEL TUBES



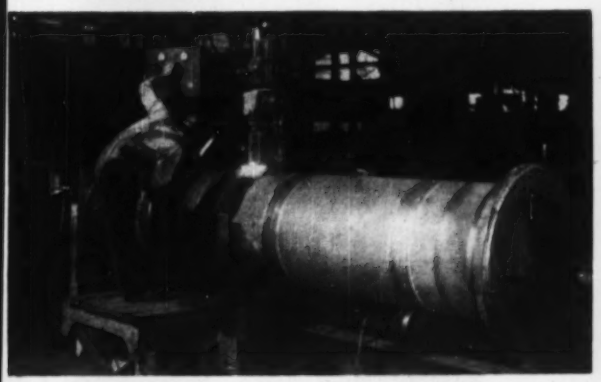
Heat Treating

Modern automatic equipment for uniform, controlled heat treating and quenching is an ACIPCO advantage for users of steel tubular products where a required combination of mechanical properties has been specified.



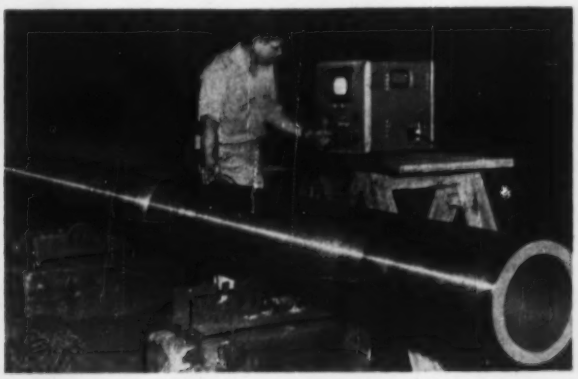
Machining

Extensive machine shop facilities are operated at ACIPCO. Steel tubes can be supplied with any degree of finish from "as cast" to honed. Shipping time and freight charges are reduced by this integrated service.



Fabricating

Complete fabricating facilities are another advantage of ACIPCO's "under-one-roof" operation. Special shapes produced by welding rolled plate or forged parts to ACIPCO steel tubes are produced by skilled craftsmen.



Testing and Inspection

Exacting metallurgical control of steel from furnace to finished product is a routine part of ACIPCO's complete service. ACIPCO employs nationally recognized methods of testing and inspection to assure sound steel tubes of high quality.

ACIPCO centrifugally cast steel tubes possess the important physical characteristics of non-directional mechanical properties, dynamic balance, dimensional stability and improved machinability. They can be furnished in all alloy and plain carbon grades, heat and corrosion resistant grades, or in special non-standard analyses to your specification. Lengths up to 16 feet are manufactured with longer lengths being supplied by welding. Outside diameters range from 2.25″ to 50″; wall thicknesses from .25″ to 4″.

50th ANNIVERSARY
ACIPCO
1905 1955

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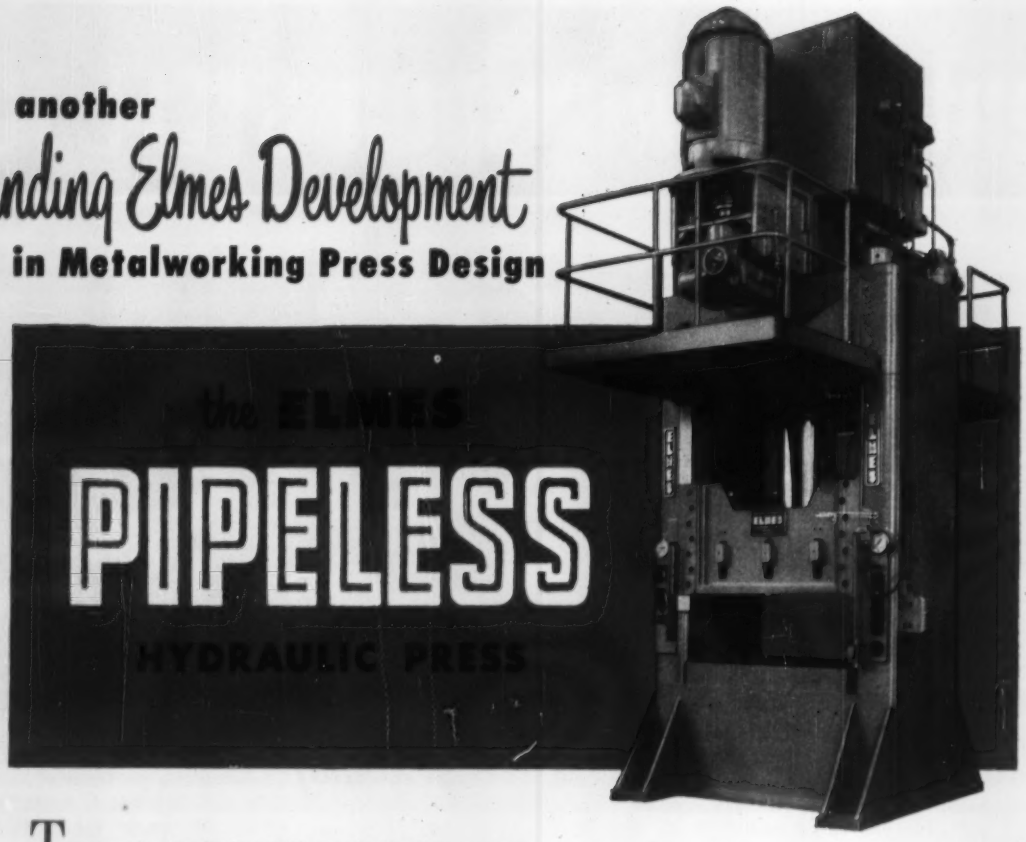
another

Outstanding Elmes Development

in Metalworking Press Design



THIS exclusive Elmes® Press design has put an end to high-pressure piping troubles. The main hydraulic circuit in these Elmes Presses *has no piping!* The advantages of this unique pipeless construction, proved by widespread use throughout industry over an extensive period, assure *a radical reduction in maintenance cost, with virtual elimination of downtime.*

In Elmes Pipeless Presses, all high-pressure hydraulic fluid is conducted through short, direct passages drilled in the structural parts. There are no high-pressure screwed joints to loosen, no oil dripping from loosened fittings, no breaking of welded joints. Press operation is smooth, quiet. Reversal of the ram is shockless. Vibration is greatly reduced. Turbulence and oil heating are minimized. Response to electrical controls is prompt and precise.

Any Elmes Metalworking Press, standard or special, can be equipped with pipeless construction—*and at no premium.* Find out now how your production will benefit from the matchless performance of Elmes Pipeless Hydraulic Presses. A proposal to suit your particular requirements, or further information, will be supplied on request. Contact your Elmes Distributor or write us direct.

HIGH-SPEED "PIPELESS" PRESS
with two reversible pumps

450-Ton Elmes Single-Action Metal Drawing & Forming Press, with many special features including the revolutionary Elmes Pipeless construction. This press employs two reversible pumps, providing the following operating speeds per minute: advance —550″, press—126″, return—550″.

Be sure to see the Elmes **PIPELESS** *Press in operation at the Show*

ELMES

AMERICAN STEEL FOUNDRIES • ELMES ENGINEERING DIVISION
1175 Tennessee Avenue...Cincinnati 29, Ohio

HYDRAULIC PRESSES & EQUIPMENT

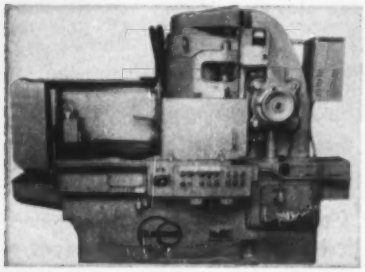
METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS

multicycle programmer and readjusting the limit switches on the carriage.

A 20-hp motor drives the spindle through a hydraulic clutch and brake in the headstock. Interchangeable headstock gearing gives spindle speeds from 164 to 1880 rpm. Monarch Machine Tool Co., Sidney, O. (Amphitheatre Booth 920)

Rotary Table Grinder

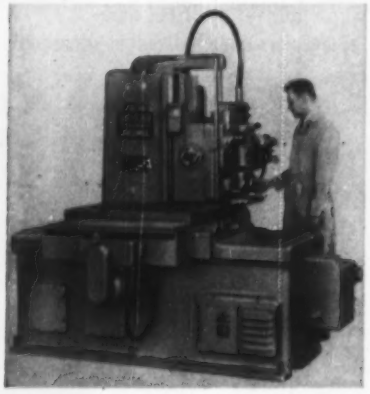
No. 18C vertical-spindle surface grinder has automatic cycle control. After setup, the operator simply loads the work on the magnetic chuck, closes the direct current circuit to the chuck, presses the "cycle start" button and the grinder completes the grinding cycle, returning the chuck to the loading position.



On suitable work, a tolerance of ±0.0005 in. can be held in regular production. Blanchard Machine Co., Cambridge 39, Mass. (Amphitheatre Booth 406)

Spiramatic Jigmill

Model 2B-36 is for "jigless boring" of production parts and the machining of jigs, fixtures and experimental parts. It has a 2½-in. diameter spindle bar with No. 40 NMTB taper, 12-in. bar feed, 24 x 36-in. table, 36-in. horizontal travel and 24-in. vertical travel.



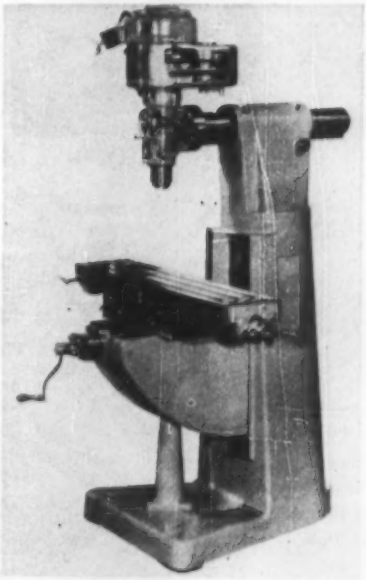
The machine is equipped with automatic positioning to horizontal and vertical slides, power-operated tool lock mechanism and a new-type index table for "jigless boring" of repetitive parts where it is necessary to accurately bore a workpiece from two or more sides. DeVlieg Machine Co., Ferndale 20, Mich. (Amphitheatre Booth 1317)

Jig Borer

This automatic positioning machine is 95 per cent pushbutton operated. Feed and speed changes, clamping and rapid traverse to the head are so controlled. Automatic positioning of the table to ±0.0001 in. eliminates old-style measuring rods. Slide and bed have direct-reading dials. Fosdick Machine Tool Co., Cincinnati 23, O. (Amphitheatre Booth 1402)

Vertical Mill

Designed for maximum convenience and ease of operation, this mill is adaptable to a variety of exacting toolroom and production work. Table is 9-in. wide and is

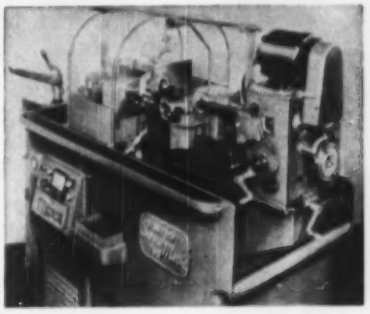


available in 32 or 42-in. lengths, with 20 or 30-in. longitudinal travel, 9½-in. cross feed and 18-in. vertical feed.

Maximum distance from spindle nose to table top is 20 in., spindle to column 20 in. Rack and pinion ram adjustment is 15 in. Adjustable stops regulate the length of the table feed. Universal-type head swivels 360 degrees for milling, drilling or boring at any angle. South Bend Lathe Works, South Bend 22, Ind. (Coliseum Booth 543)

Automatic Screw Machine

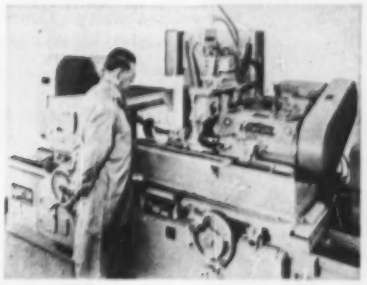
The Detroit Screwmatic 750's heavy-duty, 5-hp motor and advanced spindle design permit speeds sufficient to machine all types materials with carbide tools. Spindle speeds are variable; three forward speeds may be used during any work cycle. All speeds are reversible.

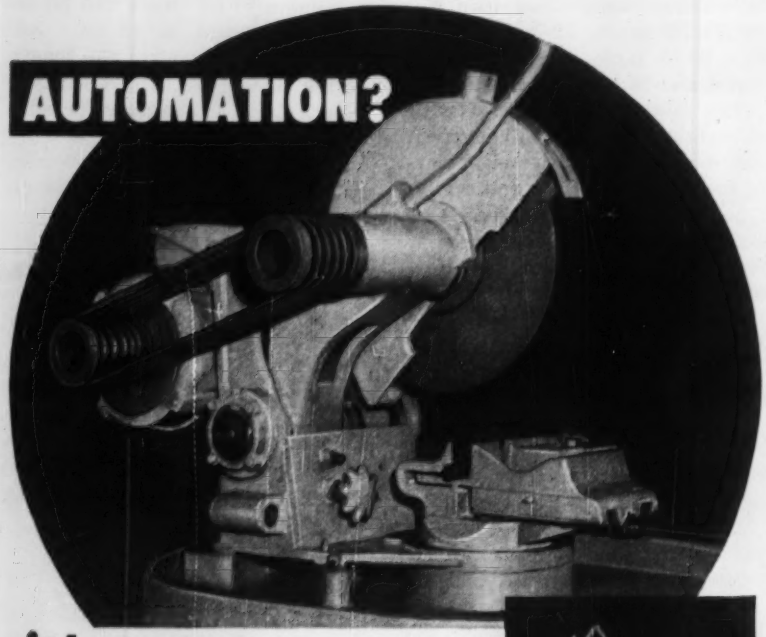


A slideable turret unit increases work length capacity. A three-position crank permits long, medium and short work to be handled with equal efficiency. Precision work is assured by heavy section cross slides and direct cam activation. Gear Grinding Machine Co., Detroit, Mich. (Amphitheatre Booth 315)

Hydraulic Cam Grinder

The cycle of the No. 3 Cam-O-Matic is automatic. It grinds all contours on the shaft (plus the eccentric), indexes the work table and master cam roller and trues the grinding wheel. Straight face cams or those having tapers in





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Here's why . . .

- Air cylinder and hydro-check actuates head . . . saves labor and reduces wheel costs. (16" dia. wheel).
- Vise operates by air cylinder . . . integrated head, vise operation is excellent safety feature.
- Feeding mechanism which grips material to be cut, moves it into position.
- A series of micro switches tie above operations into smooth cycle which repeats automatically.
- Stainless steel spindle with Grease Sealed bearings
- Coolant applied equally to both sides of cut.
- Vise holds *both* ends of piece being cut.
- Abundant power supplied by 7½ H.P. motor.
- Swivel head for accurate angle cutting.
- Accurate counterbalance of head by location of motor.
- Heavyweight for long life and efficient operation.
- *Complete automation* produces close tolerances, increases production, saves labor.

LOBDELL has a *complete line* of BRIDGEPORT Cut-Off Machines to suit every need. *Write for further details.*

LOBDELL DIVISION
UNITED ENGINEERING AND FOUNDRY COMPANY
WILMINGTON 99, DELAWARE

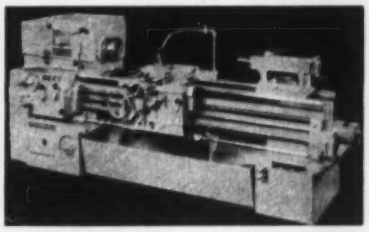
NEW PRODUCTS and equipment

one or both directions also are ground automatically.

The machine is designed for high volume production of automotive crankshafts. It meets the critical requirements for precision and finish with an advanced degree of speed, dependability and operating simplicity. Norton Co., Worcester 6, Mass. (Amphitheatre Booth 516)

16-In. Lathes

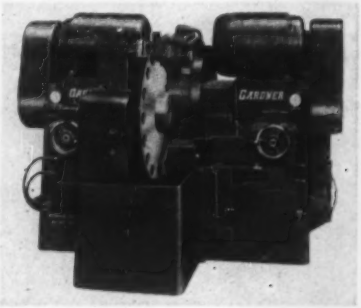
Available in engine or toolroom types, model 280 features an enclosed head with pressure lubrication to all gears; enclosed apron and gearbox, running in oil; a lightweight, unbreakable fiber glass cover protecting the end gearing; and equilateral triangular girthing of the beds.



Key rotating parts are dynamically balanced for minimum vibration and chatter. The cabinet is functionally designed and controls are grouped for greatest simplicity. Springfield Machine Tool Co., Springfield, O. (Amphitheatre Booth 612)

Double Disc Grinder

The 2H30-30-in. machine features a new spindle design which increases rigidity at the rim of the 30-in. disc. A new ways design offers greater stability. A head zeroing indicator simplifies

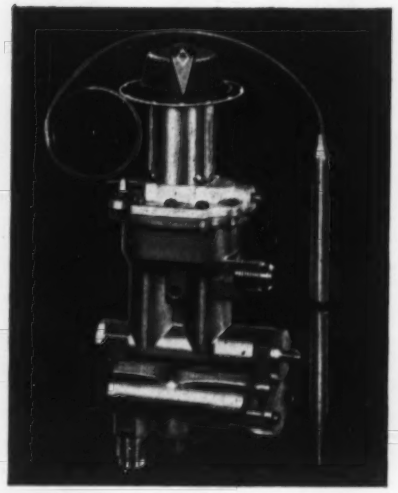


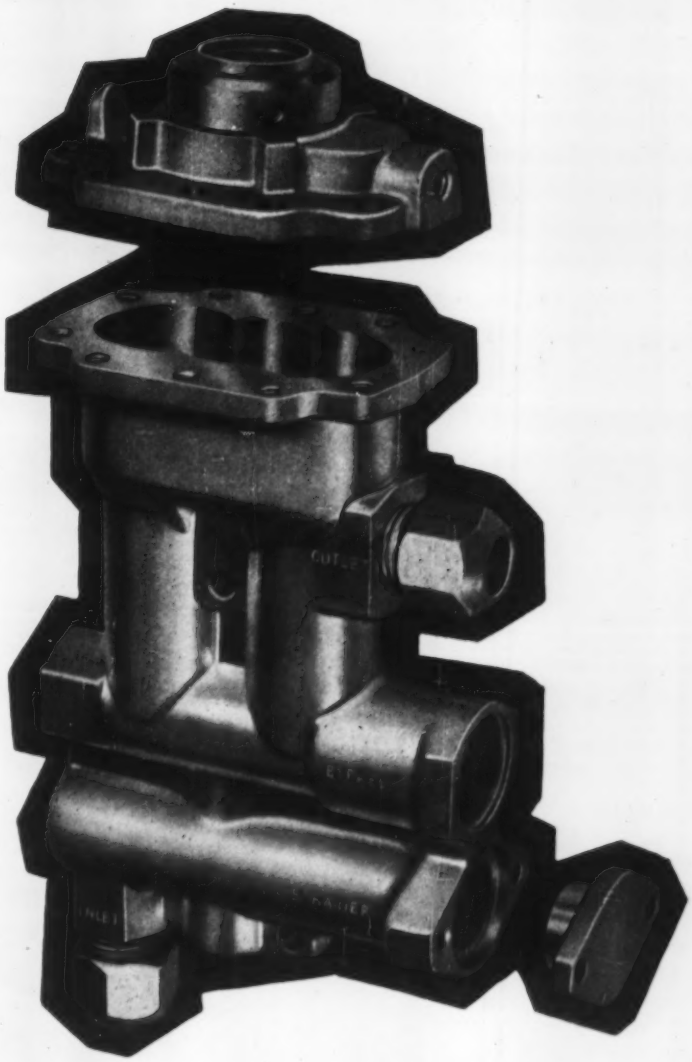
manufacture of

DETROIT SELECTAFLOW CONTROLS

greatly improved by

MUELLER BRASS CO. FORGINGS





One of the finest thermostat control mechanisms for year-around air-conditioning systems is the automatic SELECTAFLOW, a product of the Detroit Controls Corporation. To maintain the high quality of this efficient unit and at the same time speed up and simplify assembly, the body, bonnet and side cover are being forged and completely machined to close tolerances by the Mueller Brass Co. In all, thirty-four machining and finishing operations are performed. This is but one more example of how Mueller Brass Co. machined forgings have improved a product and speeded production. With a wide range of copper-base alloys for forgings, a tremendous background of product engineering, and facilities for precision finish machining, the Mueller Brass Co. can supply machined brass or bronze forgings to *your exact specifications*. It will pay you to consider Mueller Brass Co. forgings for your new or redesigned products. Write us for full color catalog and technical information.

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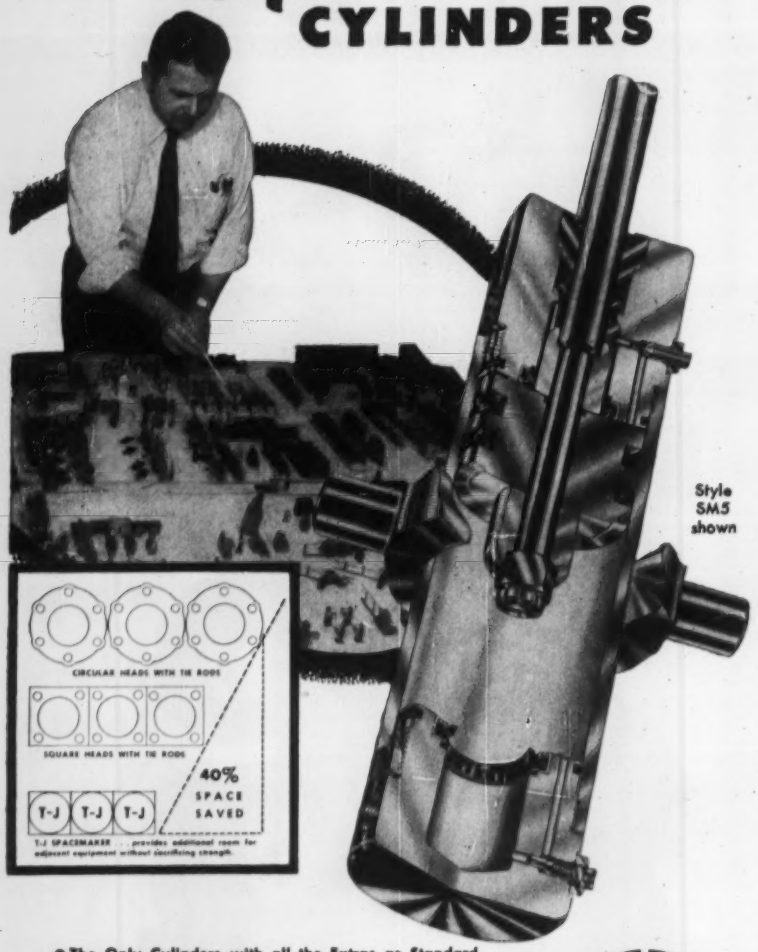
MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

Automate for top performance with...

T-J Spacemaker CYLINDERS



Style SM5 shown

- The Only Cylinders with all the Extras as Standard
- OIL pressure to 750—AIR to 200 P.S.I.
- New Compact Design . . . Saves up to 40% Space
- Proven Performance . . . with Extra High Safety Factor
- Super Cushion Flexible Seals for Air . . . New Self-Aligning Master Oil Cushion
- Hard Chrome Plated Bodies and Piston Rods (Standard)
- Only from T-J can you get these new ingenious cushion designs

OFF SHELF DELIVERY

More and more of industry's automation problems today—solved with T-J Spacemaker Cylinders! New compact design and many more plus features for a new high in efficient cylinder performance and dependability. Wide range of styles, capacities . . . to help you *save labor, reduce costs* on all kinds of push-pull-lift jobs. Send for bulletin SM-155-1. The Tomkins-Johnson Co., Jackson, Mich.

T-J TOMKINS-JOHNSON

RIVETORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHERS

Member of the National Fluid Power Association

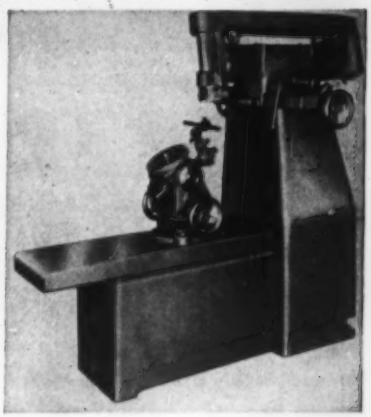
NEW PRODUCTS and equipment

tilt and swivel setup for adjustment.

Arrangement of the ball bearing ways provides sensitive feed control. The hood design makes disc changing fast and easy. Front and rear handwheels are at eye level. Gardner Machine Co., Beloit, Wis. (Amphitheatre Booth 1115)

Face Mill Grinder

This hand-operated machine sharpens face mills 4 to 24-in. in diameter. It is equipped with a cup wheel to grind close pitch face mills. A swiveling face plate is provided for cutter mounting.



The grinding unit consists of a ram which moves on a hardened track. The grinding wheel spindle can be tilted either side of center up to 90 degrees and locked in position. The spindle is driven by a 1-hp motor through V-belts. Oliver Instrument Co., Adrian, Mich. (Amphitheatre Booth 604)

Nipple Threading Grinder

No. 1 is designed to thread, ream and chamfer nipples automatically. It has ⅛ to ½-in. nipple diameter range, 4½-in. maximum nipple length.

Four spindle speeds range from 159 to 310 rpm. Speed change is made by pick-off gears. The main cam, which controls carriage movement and the transfer mechanism, is enclosed. Three cam segments attached to the cam body provide a rapid advance of the carriages to the thread starting position and then assume a feed rate equal to

"J&L 1200" Steel provides the qualities that help machine operators do top-flight work at lower overall costs. With "J&L 1200," the operator obtains: better machine finishes . . . longer tool life . . . higher rates of speed. This fact has been proven time and again—in shop after shop.

"J&L 1200" grades meet the compositions published by the A.I.S.I. . . . S.A.E. . . . and Federal Specification QQS-624.

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IN COLD FINISHED

CARBON STEEL BARS

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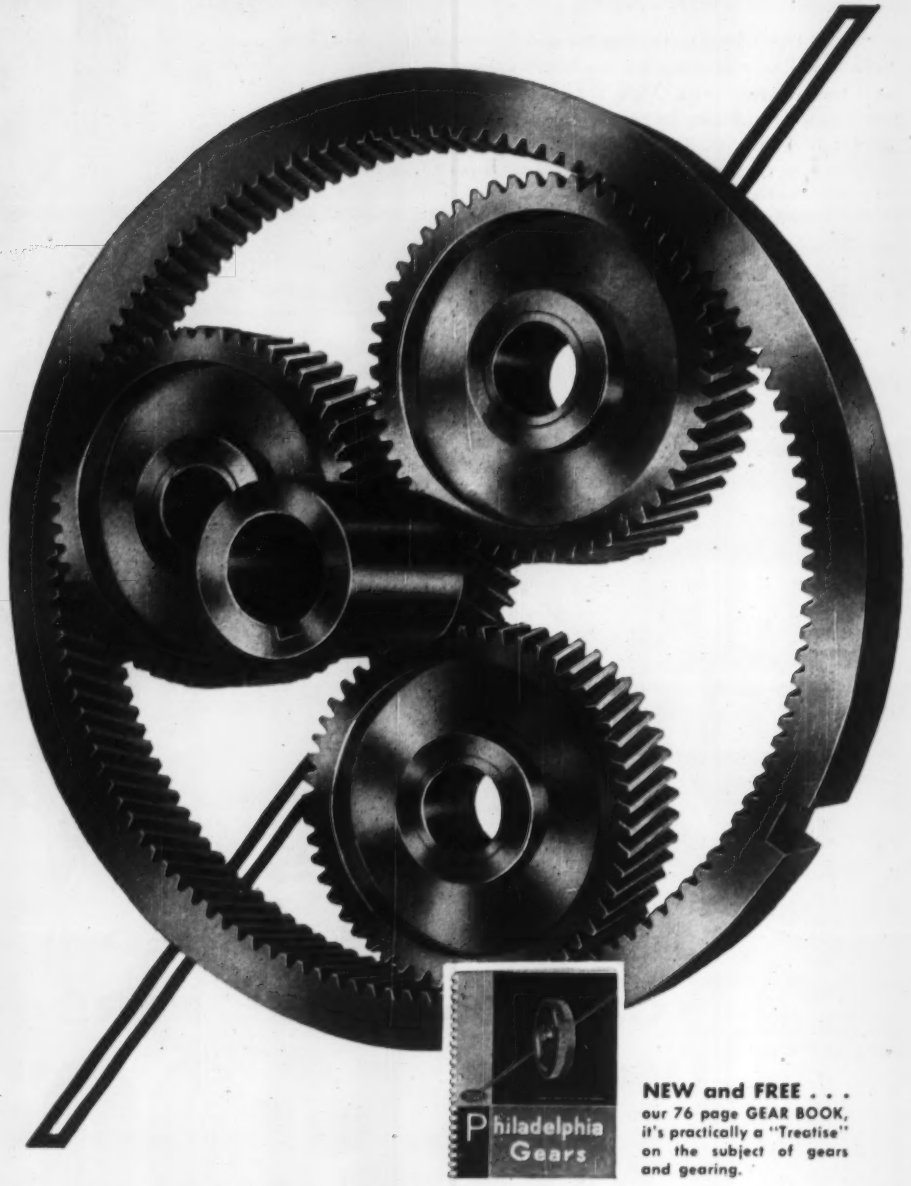
Use "J&L 1200" steel on your tough jobs for . . .

tops in quality *tops* in uniformity

tops in machinability *tops* in finish

available in all standard shapes and sizes

we know our gears "INSIDE-OUT"



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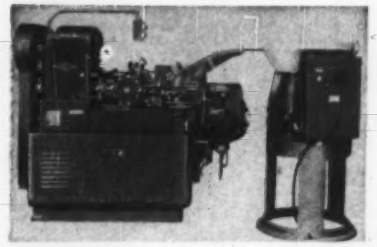
Industrial Gears & Speed Reducers • LimiTorque Valve Controls
Established 1892

NEW PRODUCTS and equipment

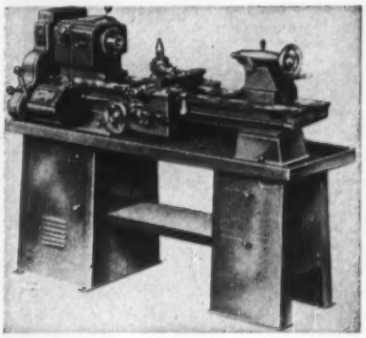


the lead of the thread being cut.

Vises are automatically opened and closed by air-operated cylinders. They can be adjusted horizontally and vertically to assure perfect alignment between nipple and die head. Landis Machine Co., Waynesboro, Pa. (Amphitheatre Booth 1406)

Engine Lathe

Features of the 6300 series, 12-in. lathe include: Forged spindle with hardened, tapered, key-lock nose; tapered roller bearings; 1-in. collet capacity; enclosed headstock, apron and quick change gearbox, all with oil-bath lubrication; outboard, underneath drive, with A-



belts driving spindle pulley; tailstock with No. 3 MT ram with tang socket for big tool capacity; heavy-duty precision, ground bed, pedestal steel-base mount. Clausing Division, Atlas Press Co., Kalamazoo, Mich. (Coliseum Booth 515)

Cylindrical Grinder

One or more diameters and an adjoining face or shoulder can be ground in one operation on the Type-K, 10-in. machine. This is because the wheel slides on "V" and flat ways which are permanently positioned at 30 degrees

Norgren the most complete line of AIR LINE FILTERS

...to reduce corrosion, wear, upkeep costs of air equipment

...to prevent contamination of oil in Micro-Fog lubrication systems

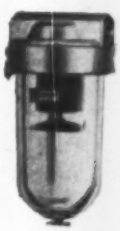
73 MODELS...7 PIPE SIZES...3 TYPES OF FILTER ELEMENTS...3 TYPES OF BOWLS

AUTOMATIC-DRAIN AIR FILTER
¼", ⅜", ½". For pressures up to 150 psi.; temperatures up to 120° F. Filter elements: 74-, 64- or 25-micron. Replaceable, transparent bowl. Series 11,200.

AIR FILTER
for pressures up to 250 psi. ¼", ⅜", ½". Replaceable, metal bowl. Filter elements: 74-, 64- or 25-micron. For temperatures up to 300° F. Series 22N.

SMALL BOWL AIR FILTER
¼", ⅜". For pressures up to 150 psi, temperatures up to 120° F. Replaceable, transparent bowl. 74-, 64- or 25-micron filter element. Series 12,200.

AIR LINE FILTERS
for pressures up to 150 psi. ¼" to 1" incl. Replaceable, transparent bowl in two sizes. 74-, 64- or 25-micron filter element. For temperatures up to 120° F. Series 22B.



MORE THAN 700,000 Norgren Filters put to use by industry

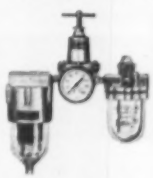
SMALL, METAL BOWL AIR FILTER
for pressures up to 250 psi. ¼", ⅜". 74-micron filter element. Permanent bowl. For temperatures up to 300° F. Series 0-552 and 0-554.

AIR FILTER
Permanent, metal bowl. ¾" to 1½" incl. 74-micron filter. For pressures up to 250 psi; temperatures up to 300° F. Series 560.

AIR PURIFIER
for exceptionally thorough removal of moisture. 74-micron Wire Screen and Yarn filter elements. Replaceable, transparent or metal bowls. ¼". Series 21B and 21N.

FILTER-REGULATOR UNIT
Automatically filters air and regulates air pressure. Replaceable, transparent or metal bowl. ¼", ⅜". Series 5A and 5N.

LUBRO-CONTROL UNIT (Model 3745A-2) typical combination of Norgren Automatic-Drain Filter, Pressure Regulator and Micro-Fog Lubricator.



Phone the Norgren representative listed in telephone directory classified section under "Norgren Pneumatic Products" or

C. A. Norgren CO.
3412 So. Elati, Englewood, Colo.

WRITE FOR CATALOG
...shows latest developments in filters with data on Norgren's complete line of oil-fog lubricators, pressure regulators, valves, hose assemblies.

from the percendicular setting.

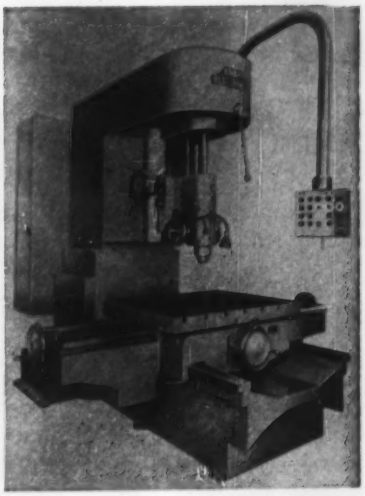
A hydraulic infeed mechanism provides automatic rapid positioning of the wheel head and a slow grinding-feed stroke which can be adjusted from zero to 0.200 in. on diameter of work.

All controls are at the front of the machine. A two-speed hand traverse mechanism is included. Landis Tool Co., Waynesboro, Pa. (Amphitheatre Booth 1117)

Electromill

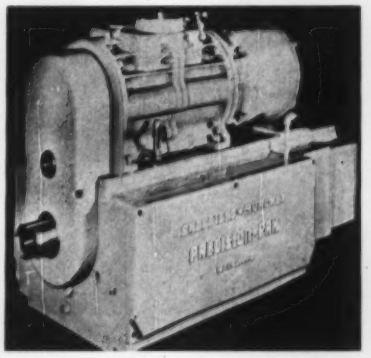
Workpieces up to 30 x 48 in., and weighing up to 5000 lb, can be drilled, bored or vertical milled on this machine. Direct drives give smooth operation. Variable speed motors offer a range of infinitely variable speeds and feeds. With 35-in. throat capacity, large work can be completed with one setting.

All controls are in a single panel that can be moved to the most convenient position—front, back or side. W. B. Knight Machinery Co., St. Louis 8, Mo. (Amphitheatre Booth 418)



Threading Unit

Model 300 Precision-Pak is an individually powered, automatic threading unit that can be mounted in any position from horizontal through vertical. It can be used for boring, chamfering and reaming.

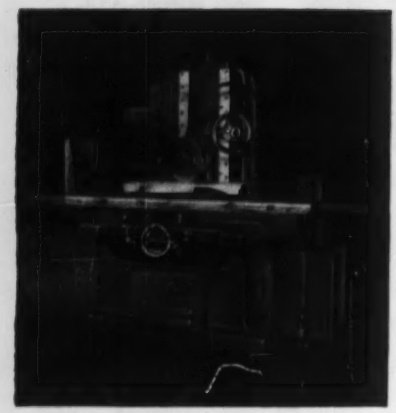


Features: Air-operated quick return stroke and opening and closing of lead head; 220/440-volt, 5-hp motors. This unit can be equipped with a hydrochek for controlling the forward stroke when used for reaming, boring and facing. Sheffield Corp., Dayton, O. (Amphitheatre Booth 1305)

Next week STEEL will present more new machines on display at Chicago.

FOUND[illegible]ERE WORLD FAMOUS AIRCRAFT ARE "BORN"

GRAND RAPIDS GRINDERS



Grand Rapids No. 55 Hydraulic Feed Surface Grinder
This precision tool room type machine Table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.

Just take a look in their toolrooms! Every one of these famous aircraft manufacturers uses Grand Rapids Grinders . . . engineered and built for unusual long life of precision grinding. Our Model 55 shown here, for instance, features column and base of massive, one-piece casting for vibrationless rigidity and permanent alignment. Both longitudinal table travel and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. Table speed is variable up to 125 fpm . . . faster than any other of this type and size.

That's why so many tool room men insist on Grand Rapids Grinders.

Just a note on your letterhead will bring you full details.

GALLMEYER & LIVINGSTON

GALLMEYER & LIVINGSTON COMPANY 407 Straight Ave., S.W., Grand Rapids, Mich.

AIRengineering at work
REPORT No. 4240.70

Air Motor Takes "Backache" Out of Molding Job...

SAVES $3.10 *a day..*

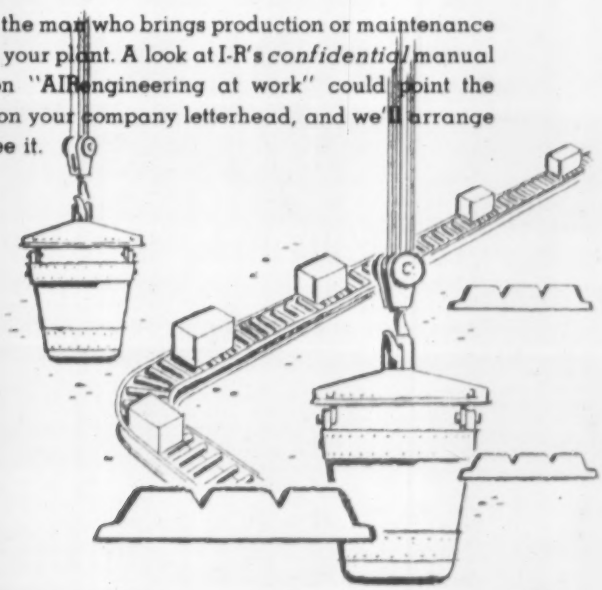
A large producer of aluminum parts had a number of strenuous jobs. One involved manually moving a four foot rack and pinion handle through a 200° arc to raise and lower a collapsible core in a book mold.

AIRengineering was put to work. An Ingersoll-Rand Size 55SO Air Motor was installed to operate the pinion. Production jumped from 180 to 220 pieces per day.... workers no longer complained . . . and savings amounted to $3.10 a day. As a result, two more Air Motors were installed, with similar savings.

You may be the man who brings production or maintenance savings into your plant. A look at I-R's *confidential* manual of reports on "AIRengineering at work" could point the way. Write on your company letterhead, and we'll arrange for you to see it.

Air Motor raises and lowers collapsible core. Here the mold is open showing the core in "up" position.

8-271



Ingersoll-Rand

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AIRengineering Manual

Don't miss over 100 interesting case history applications of AIRengineering in this confidential manual

it's no gamble!

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Super LA-LED STEEL

it REPLACES BRASS

for many machined parts!

What is Super LA-LED? It's the fastest machining steel bar commercially available . . a steel that maintains production rates approaching those of brass.

Super LA-LED's relatively low cost saves you money . . gives you a quality part where brass is now used principally because of machinability.

Ask for your copy of this descriptive brochure, "Super LA-LED Replaces Brass."

La Salle STEEL CO.

1414 150th St., Hammond, Indiana

Manufacturers of the Most Complete Line of Quality Cold-Finished Steel Bars in America

THE 1955 MACHINE TOOL SHOWS' EXHIBITORS

All three Chicago shows will run from Sept. 6 through Sept. 17. All will be closed Sunday, Sept. 11. The Machine Tool Show at the International Amphitheatre will be open from 10 a.m. to 5:30 p.m. daily. The Production Engineering Show at Navy Pier will be open from 1 to 10 p.m. daily, but will close at 6 p.m. on Sept. 17. The Coliseum Machinery Show will be open from 10 a.m. to 10:30 p.m. daily, but will close at 6 p.m. on Sept. 17.

MACHINE TOOL SHOW
International Amphitheatre

Abrasive Machine Tool Co. 317
Model 824 surface grinder; 1¼, 10 x 15 surface grinder; 1224 surface grinders; 18-in. face grinder. Dustsnaire filterless dust exhauster and separator. Graduating machine.

Ajax Mfg. Co. 1309
500-ton forging press; 3-in. forging machine; No. 0 forging roll.

American Exporter 113

American Gage & Machine Co. 417
Automatic, hold-down, through-feed centerless lapping machine. 38-ton punch press and 65-ton punch press with Hi-Flex drive and control. Boremaster ring gages; Gripmaster insertion gages.

American Machine Tool Distributors Association 81

American Machinist 114

American Society of Mechanical Engineers .. 126

American Steel Foundries 1121
Single-column, 36-in., King boring and turning machine; double-column, 56-in., King boring and turning machine. 150-ton, pipeless hydraulic metalworking press; 100-ton C-frame press. Portable, self-contained hydraulic descaler.

American Tool Works Co. 420

F. E. Anderson Oil Co. Inc. 225
Lusol K-7 chemical grinding solution; Lusol Shamrock water soluble, chemical lubricating solution; Lusol Unikool chemical cutting fluid.

Armstrong-Blum Mfg. Co. 416

Arter Grinding Machine Co. 1308
Rotary surface grinders models D (semiautomatic, hydraulic), E-16-in. and F-12-in.; model EG-103 cylindrical and internal grinder; model 200 Arter Imperia carbide tool grinder. Jigmatic tape-controlled, electronic digital positioning table.

AUTOMATION 220
A Penton publication

Automotive Industries 204

Avey Drilling Machine Co. 316
Pictorial display only.

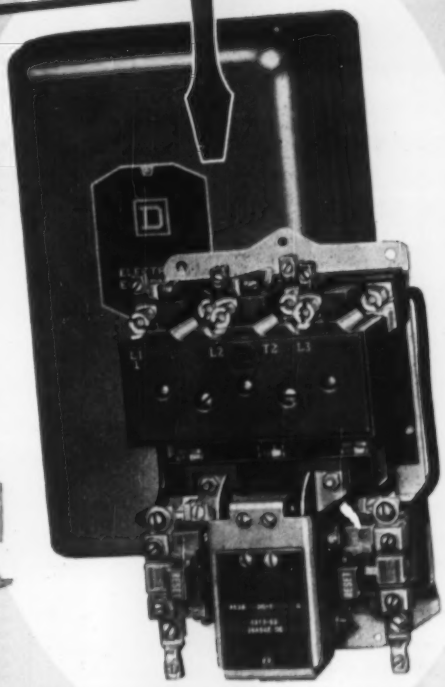
Axelson Mfg. Co., Division U. S. Industries Inc. 519
32-in. heavy-duty lathe; 20-in. heavy-duty lathe. 1¼V vertical milling machine; 10RH vertical and horizontal milling machine.

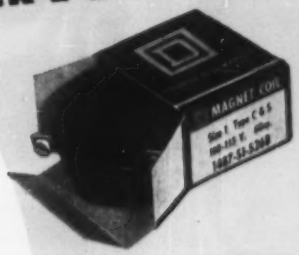
Qwik Change

with PACKAGED MOTOR STARTER PARTS!

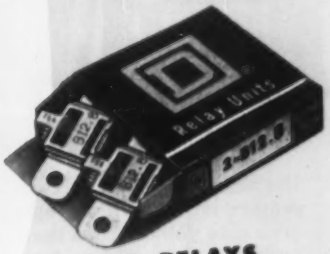
INTERLOCKS
A wide variety of quick-change, front-mounted interlocks adds flexibility for special applications

CONTACTS
Packaged replacement contacts are easily installed without disturbing wiring





COILS
Screwdriver is only tool required for quick change of magnet coil to accommodate different voltages



O. L. RELAYS
A wide variety of easily selected, packaged overload relay heater units provides quick changes to meet varying requirements for overload protection

PUSH BUTTONS AND SELECTOR SWITCH
These Kits contain all parts necessary to make quick changes from standard starters to either push button or selector switch controlled devices

EASY to Identify!
EASY to Buy!
FASTER to Install!

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

A name to Remember

The next time you're taking estimates on new presses let the Warco representative in your area give you the facts that have caused more people to buy Warco Presses the past year than ever before.

A few minutes with a Warco representative is all you'll need to see why the added quality designed and built into Warco Presses guarantee extra life at lower maintenance costs. You'll be introduced to many features, exclusive with Warco, that spell added safety, less operator fatigue and greater press speeds.

Too, your Warco representative is a specialist who'll work with you in getting a press that will do the most efficient job per dollar invested. And, you'll appreciate, like hundreds of others, the johnny-on-the-spot after sale service for which Warco representatives are noted.

So, next time you think of presses be sure you have the Warco story — it will pay you in the long run. Warco representatives located in all principal cities.

Federal® WELDERS

THE FEDERAL MACHINE & WELDER COMPANY

WARREN, OHIO

Warco PRESSES®

EXHIBITORS

Baker Bros. Inc. 1421
Three-unit transfer machine using standard units. Model KFV sensitive drilling machine. Model 25 keyseater.

Baldwin-Lima-Hamilton Corp. 203
Pictorial display and miniature working models.

Barber-Colman Co. 1322
Barber-Colman No. 3-6 vertical hobbing machine; No. 1½ automatic hobbing machine; No. 6-10 automatic hobbing machine; No. 14-15 hydraulic hobbing machine. No. 6-5 hydraulic hob sharpening machine.

Barber-Colman Co., Hendey Machine Division 221
Hendey 32-speed geared-head lathe; No. 2E general-purpose lathe; 9-in. tool and gagemakers lathe. 12-in. high-speed crank shaper.

Bardons & Oliver Inc. 325
Turret lathes: No. 1, ⅝-in. capacity, geared electric; No. 3, 1½-in. capacity, universal; No. 4, 2-in. capacity, universal; No. 7, 4½-in. capacity, universal, ram-type; No. 21 universal saddle-type. No. 32, 2-in. capacity, automatic cutting-off lathe; No. 35, 5½-in. capacity automatic cutting-off lathe.

W. F. & John Barnes Co. 1223
Scale model of complete plant layout and equipment. Five-station operating section of Barnes 26-station automatic Progress-Thru transfer-type machine. Electro-Graphic maintenance detector system. Mechanical, electrical and hydraulic units.

Barnes Drill Co. 818
Model 64 standard hydraulic drilling machine; model ⅞ UB standard heavy-duty drilling machine. Model 224-2 honing machine; model 111 honing machine. Transfer machine. Model MD-5, two-stage, magnetic and fabric filter. Magnetic coolant separator.

Bausch Machine Tool Co. 515

Beatty Machine & Mfg. Co. 614

Besly-Welles Corp. 911
No. 240, 30-in. double-spindle, horizontal disc grinder; No. 711, 18-in. Besly-Bowen radial head face grinder; No. 910, 23-in. double-spindle, vertical disc grinder.

Blanchard Machine Co. 408
No. 18C and No. 11 Blanchard vertical spindle rotary table surface grinders. Blanchard adjustable gap-type demagnetizer. Blanchard cylinder wheel holder. Assortment of Blanchard abrasive wheels. Assortment of samples grinder on Blanchard surface grinders. Monochromatic light and optical flat for checking flatness of ground surfaces. Display panels with photographs and catalogs.

E. W. Bliss Co. 1414
75-ton model O.B.I. press; 400-ton knuckle joint press; 250-ton, two-point press; high-speed, short-stroke press. Automation switch.

Bodine Corp. 209
Model 41-20 and model 42-30 dial-type, automatic multiple-spindle machines.

Boye & Emmes Machine Tool Co. 310
16 x 54-in. heavy-duty engine lathe; 20 x 72-in. engine lathe.

Brown & Sharpe Mfg. Co. 520
No. 00 automatic screw machine; No. 4 automatic screw machine; No. 2 hand screw machine. No. 20 universal milling machine, sliding-head type; No. 0 Omniversal milling machine; No. 000 plain milling machine; No. 12 plain milling machine. No. 11 face grinding machine; Nos. 1 and 3 universal grinding machines; No. 5 plain grinding machine; No. 2L surface grinding machine; No. 13 universal and tool grinding machine. Vernier calipers and height gages; precision measuring tools; permanent magnet chucks; chrome-finish rules; electronic measuring equipment; milling cutters; screw machine tools, pumps.

Bryant Chucking Grinder Co. 1015
Bryant 998 precision boring machines. Automatic internal grinders: Models 1209-Y, 2209-Y and 3216; hydraulic internal grinders: Models 1316-J and 1116-X.

Buffalo Forge Co. 610
Universal iron workers; structural iron worker. No. 10 billet shear; hydraulic billet shear. Nos. 16, 18 and 22 drilling machines; "RPM-ster" drilling machines.

Bullard Co. 1213
46-in. and 76-in. Cut Master vertical turret lathe, model 75; 26-in. Man-Au-Trol vertical turret lathe, model 75. 3-in. and 5-in. horizontal boring, milling and drilling machines, model 75. 10-in., 12-spindle and 14-in., 8-spindle Mult-Au-Matic machines, type "L".

Carboloy Department, General Electric Co. 109
Grinding services. Machinability computer. Tool holders for throw-away carbide blanks. Oxide-base cutting tool material.

Carlton Machine Tool Co. 919
Radial drills: 4A Carlton, 6-ft arm 19-in. column with preselector and programming; 3A Carlton, 5-ft arm 17-in. column with preselector and programming; 1A Carlton, 4-ft arm 11-in. column with preselector and programming; OA Carlton, 3-ft arm 9-in. column.

Cincinnati Bickford Tool Co. 901
Five Super Service radial drilling machines

including a 4-ft arm, 11-in. diameter column, a 3-ft arm, 9-in. diameter column and a 4-ft arm, 9-in. diameter column. Five Super Service upright drilling machines, sizes 21 to 28 in. One Super Service portable horizontal drilling machine.

Cincinnati Gilbert Machine Tool Co. 816

Cincinnati Lathe & Tool Co. 309
Model LE Tray-Top engine, toolroom and fixed gap bed lathes. 3-ft arm, 7½-in. column, Hardclad radial drill; 16-in. sliding head, bench and floor, single and multiple-spindle drilling machines; 16-in. and 18-in. Royal model LE drilling machines.

Cincinnati Milling Machine Co. 1205
Plain, universal and vertical knee and column-type milling machines, with and without automatic table cycles; plain and duplex automatic fixed-bed milling machines; plain automatic rise and fall milling machines; plain tracer-controlled automatic, fixed-bed milling machine; small toolroom and die milling machines. Die sinking machines with 360-degree automatic profiling and depth control. Profiling machine with line tracer. Duplex broaching machine. Cutter sharpening machines. Electrodischarge machine. Centerless grinding machines; plain and universal grinding machines; automated plain grinding machine; angular wheel head grinding machine; automated piston relief grinding machine; microcentric and chucking grinding machines; surface grinding machine. Hydroform machine and model of Hydrospin machine.

Cincinnati Milling Machine Co.,
Products Division 306
Cimcool concentrate; Cimplus concentrate; Cimcut base additive; Cimcool bactericide; Cimcool machine cleaner; Cimcool tapping compound. Cincinnati grinding wheels: Aluminum-oxide and silicon abrasives; vitrified and resinoid bonds.

Cincinnati Shaper Co. 1105
42-in. all-steel shaper; 16-in. rigid shaper. 2-30 series and 3-50 series all-steel press brakes; 9-115 series press brake; 900-ton press brake. Series 1410 shear; series 10008 shear.

Clearing Machine Corp.,
Division of U. S. Industries Inc. 716
60-ton O.B.I. presses with friction clutches; 75-ton standard horn press; type S-2200-60 streamline press; type F-2350-84 press with hydraulic overload; type SDA-2250-54 press with Clearomatic clutch; type H-300-42 hydraulic press.

Cleereman Machine Tool Co. 1007
Quick-change-type upright drilling machines; series "A" automatic drilling and tapping machines; layout drilling machine. Jig borer.

Cleveland Automatic Machine Co. 412
3-in. model "AB" Dialmatic single-spindle automatic; 2½-in. model "AW" single-spindle automatic; 1⅝-in. model "AB" Dialmatic single-spindle automatic.

Cleveland Crane & Engineering Co. 1418
Steelweld shear. Steelweld bending press. Steelweld Hi-Draw press.

Cleveland Grinding Machine Co. 810

Cleveland Tapping Machine Co. 409
Model E lead-screw tapping machine; series F lead-screw automatic fittings tapping machine; Cleveland Jr. multispindle drill-tapper. Bench radial drill. Automatic power-driven index table.

Colonial Broach & Machine Co. 1112
One-Way vertical surface broaching machine; "4" convertible broaching machine. Model CS-36 round and flat broach sharpener.

Cone Automatic Machine Co. Inc. 401
Model TK, ⅝-in. and model TF, 1⅝-in. six-spindle Conomatic bar machines; model VE, 1⅝-in. eight-spindle bar machine; model AD, 3½-in. four-spindle bar machine; model KM, 5-in. single-spindle bar machine; 1-in., 4-Hi Conomatic bar machine. Model TJ, 9⅝-in. and model TU 5⅞-in. six-spindle Conomatic chucking machines.

Consolidated Machine Tool Corp. 217

Conover-Mast Publications Inc. 103
Mill & Factory

Covel Mfg. Co. 720
No. 32, No. 12-A and No. 6 universal and tool grinders; No. 35 and No. 60 horizontal, hydraulic-feed, reciprocating table surface grinders; No. 7 and No. 10 hand-feed surface grinders. No. 14 optical comparator.

Cross Co. 1118
Transfer-matic for crankshaft bearing cap clusters; machine control units for Transfer-matic. Tool control units; flow-control locks.

Cutting Tool Manufacturers Association ...303

Danly Machine Specialties Inc. 1302
882-200-60-36 single-action press; D2-400-84-42 double-action press; H2-100-48-30 automatic feed press with Danly double roll feed, scrap cutter; gap frame hydraulic press. Coil cradle and stock straightener. 30-ton portable piercing and riveting hydraulic units; 10-ton portable piercing and riveting units. Press accessories and attachments.

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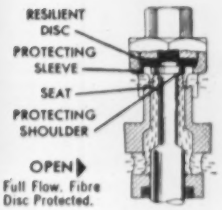

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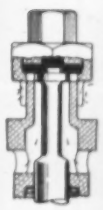
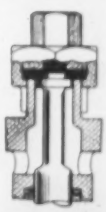
CLOSING OR ◀ OPENING
Flow practically stopped by close fitting sleeve and stem shoulder, before seat and disc make contact. This prevents "wire drawing." Trapped water cushions closing, dampens hydraulic shock.



CLOSED ▶ Protected resilient disc against metal seat assures drop-tight seal, long life, accurate control, and low maintenance.



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Precision-Built MILLING MACHINES Since 1888!

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EXHIBITORS

Davis & Thompson Co. 802
Denison Engineering Co., Division of American Brake Shoe 819
50-ton press with index table; 4-ton D-frame Multipress; 8-ton F-frame Multipress with servo control; 15-ton press with index table; 4-ton stock-feed press; 4-ton D-frame press with index table; 4-ton Multipress with automatic controls. Precision-built pumps, motors and controls.
DeVlieg Machine Co. 1317
Models 2B-36 and 3B-72 Spiramatic J'gmil precision boring and milling machines. Microbore precision tooling including the Microbore Flash-Change.

Economy Engineering Co. 1214
Edlund Machinery Co., Division of Bradley-Edlund Co. 115
Drilling and tapping machines: Model 1F, ¾-in. capacity; model 2F, 1¼-in. capacity; model 4F, 1½-in. capacity.
Ex-Cell-O Corp. 1319
Style 112-D, single-end, hydraulically operated precision boring machine; double-end hydraulically operated precision boring machine; cam-operated boring machines. Style 39-A automatic internal thread grinder; Scru-Broach nut threading machine. Style 44-A, style 49-A, style 48-B, style 46-D tool grinders. Quill-type, hydraulic power units. Cutting tools, spindles, railroad pins and bushings, drill jig bushings.

Famco Machine Co. 807
Air-arbor, drill and power presses. Air squaring and power squaring shears. Vertical milling machines. Metal cutoff bandsaw.
Federal Press Co. 801
No. 8A 100-ton O.B.I. press with air clutch; No. 3 dial feed press; No. 3A, 26-ton high-speed press with air clutch; No. 44 press.
Fellows Gear Shaper Co. 1416
Fine-pitch gear shaper; automated line of two gear shapers and one shaving machine with chamfering attachment; fine-pitch shaving machine with deburring attachment. Spur cutter sharpening fixture; involute measuring instrument; lead measuring instrument; instruments for checking gear errors in combination.
Ferracute Machine Co. 1311
CG-37½ 200-ton O.B.I. press.
Fitchburgh Engineering Corp. 208
Foote-Burt Co. 1409
No. 58 single-chain, continuous surface broaching machine. 8IP-type sensitive, four-spindle drilling machine; Hammond radial drilling machine. Hammond surface grinding machine.
Fosdick Machine Tool Co. 1402
Automatic positioning jib borer. Jig grinder. 4-ft and 6-ft hydraulic radial drills. Automatic positioning table. No. 4BM and No. 5BM sensitive drills; sensitive radial drills.
FOUNDRY 230
A Penton Publication.
Fox Engineering Co. 419
E-60-HT vertical, multiple-spindle, hydraulic-feed drilling and individual lead-screw-feed tapping machine.
Frauenthal Division Kaydon Engineering Corp. 806

Gallmeyer & Livingston Co. 906
Grand Rapids production, hydraulic-feed surface grinders; precision toolroom hydraulic-feed surface grinders; hydraulic-feed OD and ID grinder; universal and tool grinders; cutter and tool grinders.
Gardner Machine Co. 1115
2H30-30-in. double disc grinder; 2V18 vertical double spindle grinder; 125-30-in. horizontal double disc grinder.
Gear Grinding Machine Co. 315
SG-10X24FAL spline grinding machine; GG-10X24FA gear grinding machine. Detroit Screwmatic 750 single-spindle, automatic screw machine.
Gemco Shaper Co. 706
24-in. standard-duty, universal-type Gemco shaper with power down feed to tool head.
Giddings & Lewis Machine Tool Co. 710
Hypro-planer-type milling machine; 460-FUAR and 570-FUAR floor-type, horizontal boring, drilling and milling machines; 350-T and 300-RT table-type, horizontal boring, drilling and milling machines. Hypro double housing planer. 8-ft Hypro vertical boring and turning mill. 42-in. vertical turret lathe. Lubri-Cool lubrication cooling system.
Gisholt Machine Co. 1413
Ram-type turret lathes: No. 3 Electram; No. 4 Ram; No. 5 Ram; Big Bore No. 5 Ram. Saddle-type turret lathes: 1L Saddle; 2L Saddle; 3L Saddle; 4L Saddle; 5L Saddle. Automatic production lathes: No. 12 horizontal; No. 12 vertical; No. 12 automatic; No. 24 automatic; the Simplimatic. Automatic turret lathes: Automatic No. 5 Ram; 2F Fastermatic tooled; 2F Fastermatic cycled. Superfinishers: No. 52A general purpose; No. 54 two-spindle

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EXHIBITORS

machine; No. 79 bearing race machine; No. 81 valve tappet machine; No. 3 attachment. Dynetric balancing machines: 18B bench model; 31B floor model; 18V1 vertical model; type-4U floor model.

Geometric Tool Co. Division, Greenfield Tap & Die Corp. 223
Self-opening die heads and collapsing taps. Carbide-tipped chasers; aligning shank tools; Supermetric ground chasers. Chaser grinding center. Lathes and automatic screw machines equipped with Geometric heads.

George Gorton Machine Co. 1019
"Master-Mil" turret-type, swivel-head mill; multiple-purpose milling machine; model 3-36 medium-duty horizontal; model 3-48 vertical. Models P1-2 and 3-Z two-dimensional pantographs; models P1-3 and P2-3 three dimensional pantographs; model P3-2 two-dimensional pantomill. Model 16-B automatic screw machine. Model 687-2 graduating machine. Model 375-3 universal grinder; model G-2 table-model, plain or universal grinder. Duplicator table. Small tools and accessories.

Gess & deLeeuw Machine Co. 1113

Gould & Eberhardt Inc. 1424
10HQ HoBlique helical gear hobbing machine. 72B gear cutting machine. 24H and 48H high-speed, universal gear hobbing machines. G&E industrial and toolroom shapers.

G. A. Gray Co. 1120
Gray 36-in. x 10-ft universal planer. Gray 36-in. x 8-ft open side handymill. Gray model 650 FC horizontal boring, drilling and milling machine.

Greaves Machine Tool Division, J. A. Fay & Egan Co. 721

Greenlee Bros. & Co. 1221
Special auger-bit milling machine. Six-spindle bar automatic with air feed and high-speed spindles.

Hamilton Tool Co. 212
Variamatic drill. No. 1 and No. 00 gear hobbers. Precision small hole tapping machine.

Hanson-Whitney Co., Division Whitney Chain Co. 807
Thread milling machine. Tapping machine.

Hartford Special Machinery Co. 201
Automatic hydraulic controlled drill units; No. 40 and No. 60 automatic cam feed drill units; No. 405 and No. 410 hydraulic feed units; Hartford special super-spacer; lead-screw tapping unit.

Heald Machine Co. 902
Models 2215 and 3215 horizontal, cam-actuated Bore-Matics; vertical-spindle, cam-actuated Bore-Matic. Two model "8" Bore-Matics in sample automated production line. Precision tool sharpening machine. Model "8" vertical Bore-Matic. Two vertical-column, rotary surface grinding machines model 161 with 6-in. chuck and model 316 with 24-in. chuck. Model 190 Centri-Matic bore grinding machine; model 1901 Centri-Matic ball track, internal grinding machine; model 170 automatic chucking, internal grinding machine.

Hitchcock Publishing Co. 121
Machine & Tool Blue Book

E. F. Houghton & Co. 318
Antisep all-purpose cutting base; Sta-Put oils and greases; Hydro-Drive and Houghto-Safe hydraulic fluids; Houghto-Clean 220 emulsion cleaner; Rust Veto rust preventives.

Hydraulic Press Mfg. Co. 718
5-ton, 10-ton, 25-ton and 50-ton oil hydraulic C-frame presses, manual and automatic; 400-ton Fastraverse press. Hydraulically-powered index table. Hydraulic press components.

Illinois Tool Works 1323
The Iron Age 119

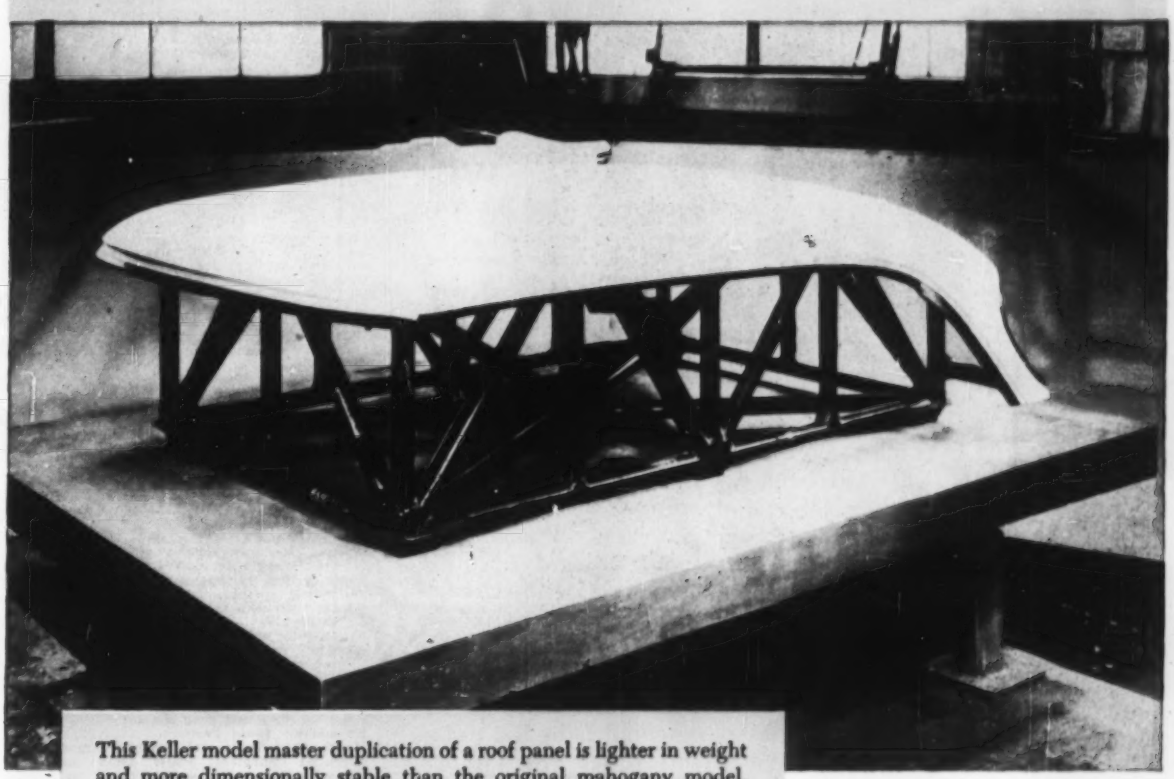
Johnson Machine & Press Corp. 411
Jones & Lamson Machine Co. 1111
Turret lathes: 7A-2½ saddle type with automatic numerical tape control; 7B-4½ saddle type with 32 speed hydra-clutch headstock and six-position cross sliding turret; 7A-4½ saddle type; 7B-3½ saddle type; 10B-6½ saddle type; No. 3 ram type; No. 4 ram type; No. 5 ram type. Automatics: 8-in. Fay self-resetting lathe with automatic feed back control; No. 40 Faymatic Tracer sequentially controlled; No. 40 Faymatic lathes. Grinders: Model E form grinder; optical contour surface grinder; model E groove grinder; tap grinder; 6 x 36-in. thread grinder; 12 x 45-in. thread grinder. Optical comparators with multilens turrets.

Kaukauna Machine Corp. 1210
Kaukauna model 3040 horizontal drilling and boring machine. Kaukauna model 140-U universal radial drilling machine.

Kearney & Trecker Corp. 508
Plain and vertical TK series deluxe, knee-type milling machines; plain, universal and vertical TF series standard knee-type milling machines;

Make tools faster, more dimensionally stable

WITH COMPOUNDS BASED ON BAKELITE TRADE-MARK EPOXY RESINS



This Keller model master duplication of a roof panel is lighter in weight and more dimensionally stable than the original mahogany model. It's made from plastic tooling compounds based on BAKELITE Epoxy Resins and produced by **Ren-ite Plastics, Inc.**, Lansing 4, Mich.

Metalworking tools cost less when they're made with BAKELITE Brand Epoxy Resins. Compared with conventional materials, these compounds offer quick, easy production, plus these advantages:

- Liquid compounds—can be cast to shape without pressure
- Cured at room temperature—no applied heat
- Minimum shrinkage—minimum finishing
- Excellent flexural, compression, and impact strengths
- Outstanding dimensional stability
- Lighter weight that means easier handling
- Laminated with glass cloth to form jigs, spotting racks, fixtures and Keller models.

For more information, write Dept. JZ-172.

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EXHIBITORS

Mil-Waukee-Mil bed-type production milling machines, Simplex and Duplex, Model C Autometric precision boring machines. Five-station rotary indexing machine; rotary index table; feed slide; quill feed unit; lead-screw tapping unit; way-type drill unit. Compudex indexing computer.

Kempsmith Machine Co. 616
Master-Mill knee-type milling machine. Attachments, arbors and accessories.

Kennametal Inc. 123
Grade K21 cutting material; 17 styles in a range of sizes in Kendex cemented carbide tooling. Tool grinding service.

Kent-Owens Machine Co. 1218
Milling machines: No. 3-36, No. 2-20, No. 2-20D8, No. 1-14 and No. 1-M.

Kingsbury Machine Tool Corp. 915
Models No. 4 and No. 16 cam feed drilling units; models No. 5 and No. 17 cam feed tapping units.

W. B. Knight Machinery Co. 418
Electromill with 26 x 48-in. table and No. 50 Knight vertical milling and boring machine. No. 25 Jigmaster jig boring machine. 42-in. power feed rotary table. Hole grinding attachment for jig borer or milling machine.

L & J Press Corp. 407
No. 20-2-24 double-crank, straight-side, high-speed press; No. 5, 56-ton, O.B.I. punch press, geared model; No. 6, 65-ton. O.B.I. punch press. L & J press load indicator.

Lake Erie Engineering Corp. 1310
300-ton, triple-action, deep-draw hydraulic press.

Landis Machine Co. 1406
Lanhyrol thread rolling machines; type C Landmaco thread cutting machines; No. 1 Landmaco automatic nipple threading machine; 32C Landmaco threading machine; No. 1 Landis centerless thread grinder; double-spindle, semiautomatic threading machine. Threading tools include die heads, collapsible and solid adjustable taps and Lanroll thread rolling attachment.

Landis Tool Co. 1117
6 x 18-in. and 10 x 36-in. type K semiautomatic plain cylindrical grinders; 10-in. type K plain cylindrical grinder; 4-in. type H plain hydraulic grinder; 12 x 36-in. type K universal cylindrical grinder; Nos. 12 and 12½ centerless grinders; 16 x 40-in. and 10-in. type H-IW multiple wheel hydraulic grinders; 4-in. concentric grinder; type DH semiautomatic hydraulic cam grinder; 12 x 28-in. universal and tool grinder; Landis Grindwell general-purpose cylindrical grinder; 10 x 20-in. type H universal grinder. Ball-bearing race production line. Automated valve grinding line.

Lapointe Machine Tool Co. 707
Broaching machines: VUE-7 electric-drive, vertical pull-up; 120-in. continuous; horizontal electric-drive, 72-in. stroke; single-ram horizontal, 180-in. stroke; 60-in. capacity machine; horizontal HP-10 internal broaching machine.

R. K. LeBlond Machine Tool Co. 1313
50-in. roll contouring lathe; 125-hp. 32-in. heavy duty engine lathe; 16-in. heavy-duty engine lathe; 20 and 32-in. heavy-duty engine lathes; 13, 15, 17 and 19-in. swing Regal lathes; 15-in. dual-drive lathe; 25/50-in. sliding bed gap lathe. LeBlond-Carlstedt rapid borer. Automatic line bearing crankshaft machine.

Lees-Bradner Co. 1212
Model 7 type HD Hevi-Duty, high-production gear hobber.

Leland-Gifford Co. 321
Hole Locator drilling machine; sensitive and high-production drilling machines.

Lipe-Rollway Corp. 803
Model 200 AMS multiple-spindle, automatic magazine loading bar feed, designed for the Conomatic; single-spindle bar feed; AML bar feed. Hand-I-Hack portable power hack saw. Carbo lathe.

Lodge & Shipley Co. 502
10-in. Hy-Turn lathes; 16-in. toolmaker lathe; 16-in., 45-degree Copymatic lathe; 16-in., 90-degree Copymatic lathe; No. 40 Floturn lathe; 60-in. T lathe type O; 25-in. hollow-spindle Copymatic lathe. Model 180-10 press brake, 10-ft x $\frac{1}{4}$-in. capacity. Model 0610 squaring shear, $\frac{1}{4}$-in. x 10-ft capacity.

Logansport Machine Co. Inc. 1114

MACHINE DESIGN 220
A Penton publication.

Machinery 226

Mattison Machine Works 1422
Combination way and surface grinder; high-powered precision surface grinder, horizontal spindle; rotary-type surface grinder with automatic cycling, vertical spindle; 4-spindle rotary automatic surface grinder; rotary surface grinder vertical spindle, reciprocating table.

Metal-Working 125
Sutton Publishing Co. Inc.

Michigan Tool Co. 1220
Automatic gear production line includes: Model 1445 universal Ultra-Speed hobber; Michigan gear washer; 3-Way gear classifier; Model 870 "underpass" gear finisher. Roto-Flo spline roller. Shear-Speed gear shaper.

Micromatic Hone Corp. 1211
Model 6110 horizontal machine; model 844 Microflat machine; model 836-2 automatic Microflat machine; model 738-C automatic Microhoner; four-spindle model 710-4 Hydrohoner; model 728 machine; model 731 Microhoner; model 425 Hydrohoner; model 715 Hydrohoner. Micromatic multiple-diameter tool.

Minster Machine Co. 1410
MS2-150 straight-side, two-point press; G1-110 single-point, steel-frame gap press; No. 4, 32-ton, O.B.I. press; P2-45 "Piece-Maker", straight-side, two-point, automatic production press.

Modern Machine Shop 210

Moline Tool Co. 1304
Model HU110 vertical single-column, hydraulic-feed, universal-joint-type drilling machine; model HD67 straight-line drilling machine. Spindle units.

Monarch Machine Tool Co. 920
Series 90 Dyna-Shift and series 62 Preselector Dyna-Shift lathes; model 21 Mona-Matic manufacturing lathe; Hydra-Slide chucking lathe.

Morris Machine Tool Co. 912
13-in. and 15-in. column radial drills. Automatic piston balancing machine. Special-purpose, multiple-spindle production machine with Air-Oil-Matic drill unit. Air-Oil-Matic drill units; cam-type drilling unit.

Morton Mfg. Co. 408

Motch & Merryweather Machinery Co. 606
No. 2-8-A circular sawing machine. G-45 circular saw blade sharpener. Model 3-MCT milling and centering machine. M & M bed-type, production milling machine.

National Acme Co. 324
Threading tools: Vers-o-tool self-opening heads; collapsible taps; National Acme Fette self-opening thread rolling heads. Thread-rolling machine. Snap-Lock limit switches; Super-Sensitive light contact limit switches; control station and motor starter switches; Namco solenoids.

send for this data and discover

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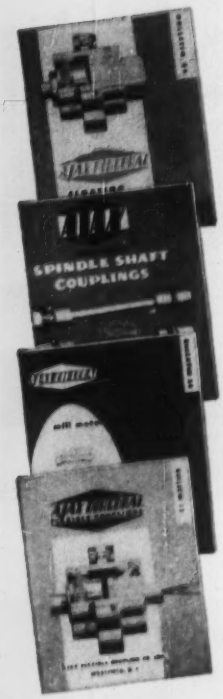
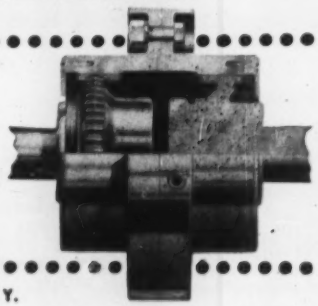
are raising performance standards of DIRECT-CONNECTED MACHINERY



● Misalignment as well as alignment have always been a plague of industry. Ajax Dihedral Self-aligning Couplings, introduced 5 years ago, have rewritten the specifications and performance records of rolling mills, paper mills, cranes, dredges, earth moving and other heavy duty machinery.

They deserve the serious consideration of every executive, directly or indirectly concerned with performance, economy and reputation. Ajax patented Dihedral design handles angular and offset misalignment heretofore impossible with conventional flexible couplings.

Ajax Dihedral performance is a challenge to complacency... for further information consult your telephone directory or write the Ajax factory for Bulletin 52.



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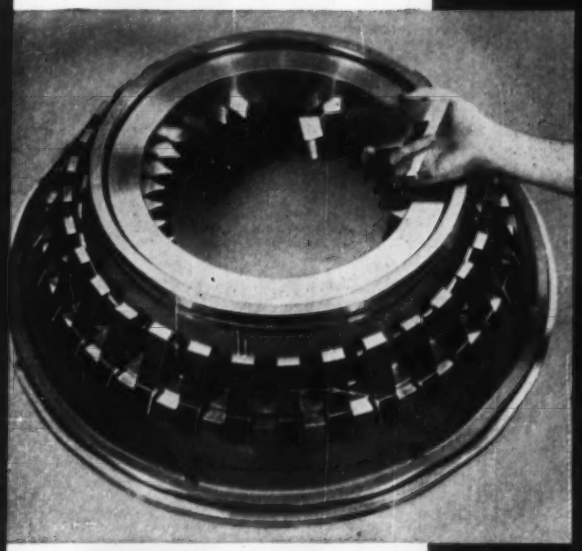
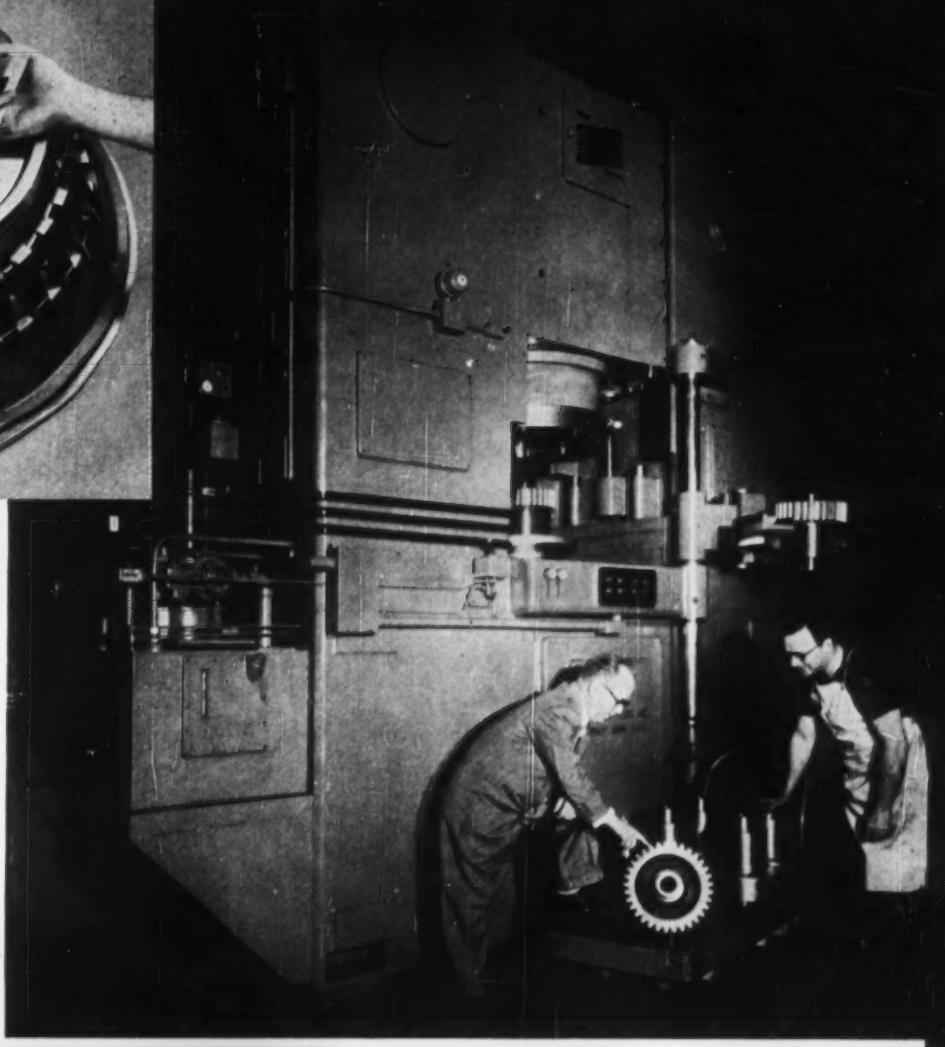
This Month's

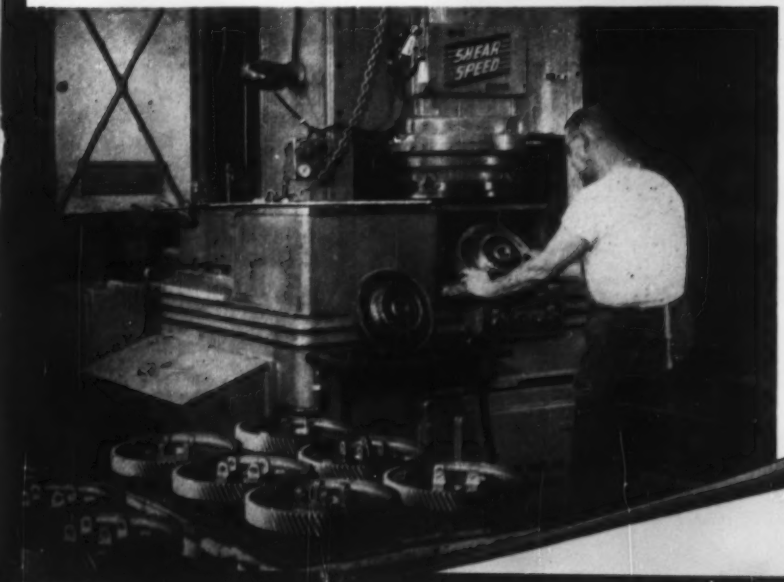
GEAR PIX



▲ RUGGED ACCURACY is built into this SHEAR-SPEED tool holder used to cut the 33-tooth bull gear in 6½ minutes on the new giant SHEAR-SPEED.



▼ VERSATILITY—Shoulder gear (7.25" dia. x 1" face) being formed on this 18105 SHEAR-SPEED gear shaper at the rate of 23 per hour, is one of 12 different tractor gears regularly produced on this fastest of gear cutting machines.



▲ VERITABLE GIANT is this new SHEAR-SPEED gear shaper. Cutting time on the tractor bull gear shown is 6½ minutes compared to 3 hours by former methods. New bulletin describes the two new SHEAR-SPEEDS with capacities up to 6" face width, 13" and 20" maximum diameters.

MICHIGAN TOOL COMPANY

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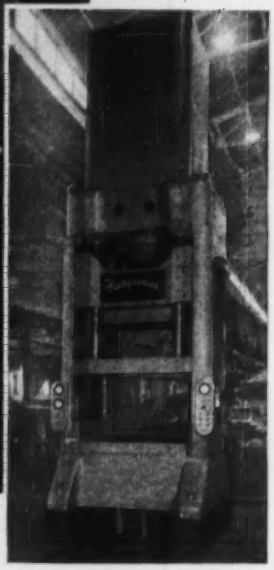
IN CANADA: COLONIAL TOOL CO., LTD.

Operator removing completed ceiling diffuser ring from Farquhar Hydraulic Press at Tuttle & Bailey, Inc., New Britain, Conn.



Tuttle & Bailey reports:

FARQUHAR HYDRAULIC PRESS Makes New Product Possible

Tuttle & Bailey, Inc., New Britain, Conn., produces heating convectors, ceiling diffusers, grilles, registers, etc., as well as several defense products for the United States. When production of the ceiling diffusers was first planned, the company found they could not be manufactured with existing equipment at their plant.

Tuttle & Bailey then consulted with various hydraulic press companies, searching for a design to meet their requirements. Finally, the A. B. Farquhar Company came up with the best design—*and at the lowest cost*—a 450-ton press with pressing ram speed of 0 to 45 in./min., approach and return speed of 390 in./min., and an operating hydraulic pressure of 2650 lbs./sq. in.

The company is very pleased with Farquhar's low maintenance cost, too. The press was installed in Aug. 1950, and has required no maintenance other than occasional gasket replacement.

Farquhar Presses Cut Your Costs

The above installation is just one more example of Farquhar performance in heavy production! Farquhar Presses are built-for-the-job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of extra-long guides on the moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

For our free catalog showing Farquhar Hydraulic Presses in all sizes and capacities for all types of industry, write to: THE OLIVER CORPORATION, A. B. FARQUHAR DIV., Hydraulic Press Dept., 1522 Duke St., York, Pa.

Farquhar

HYDRAULIC PRESSES

for Bending • Forming • Forcing • Straightening • Assembling • Drawing
Extruding • Joggling • Forging • and other Metalworking Operations

THE OLIVER CORPORATION • A. B. FARQUHAR DIVISION

EXHIBITORS

National Acme Co. 705
4-in. and 1¼-in. Acme-Gridley eight-spindle bar automatics; 4⅝-in. model MR single-spindle, fully automatic bar-type turret lathe; 1-in. six-spindle machine; 5¼-in. six-spindle, hydraulic chucking automatic; 8-in. eight-spindle hydraulic chucking automatic; 12-in. single-spindle chucker; 12-in. Chuck-Matic single-spindle chucker.

National Automatic Tool Co. Inc. 1123
Scale working model of 120-ft Natco Holeway machine. B33D vertical, multiple-spindle sensitive tapper; H6 vertical, multiple-spindle sensitive driller and tapper; D4B vertical, multiple-spindle, heavy-duty drilling machine. B42 mechanical feed unit. C20B Borface machine. Special drilling machine.

National Broach & Machine Co. 1215
Model GCR-12-in. internal gear shaving machine. Red Ring air-powered broaching fixture. Model GSC-10-in. gear nick tester. Model GRD automatic gear gaging and sorting machine. Model GCU-12-in. gear shaving machine equipped with automatic loader; model GCU-8-in. gear shaving machine equipped for semi-automatic loading; model GCI-12-in. gear shaving machine with extra long table. Model GSD-14-in. gear speeder; Model GSC-10-in. gear speeder. Model SIC-12-in. gear checker. Red Ring gear rolling fixture adapted for internal gears.

National Machinery Co. 918
Ten automatic and hand-feed hot and cold forging machines.

Nebel Machine Tool Co. 511
Extension bed gap lathe; 16-in. model "LA" engine lathe; 36-in. model "F" engine lathe.

New Britain Machine Co. 1419

NEW EQUIPMENT DIGEST 220
A Penton publication.

Niagara Machine & Tool Works 715
Front-to-back crankshaft inclinable press; straight-side eccentric geared press; straight-side double crank press; single and double-crank O B I. presses; front-to-back crankshaft adjustable bed horning press; press brakes. Bending rolls. Power squaring shears.

Norton Co. 516
No. 3 Cam-O-Matic automatic cam contour grinding machines; automatic transfer-type crankpin grinding machine; type CM-1 multi-wheel grinder; 12 x 36-in. type U-4 universal grinder; 10-in. type CV-4 semiautomatic angular wheel side grinding machine; 10-in. type CTU semiautomatic cylindrical grinder.

Ohio Machine Tool Co. 301
Hydra-Feed lathe. No. 410, 1-in. capacity, and No. 415, 1½-in. capacity, quick-change upright drills.

Oliver Instrument Co. 604
Hand-operated face mill cutter grinder; No. 2 arc radius grinder; hydraulic-automatic face mill grinder; universal tool and cutter grinder; 20-in. template tool bit grinder. Drill point thinner; No. 21 bench-type drill pointer; No. 510 pedestal drill pointer. SP-2 pedestal model die making machine; heavy-duty die making machine.

Onsrud Machine Works Inc. 812
A24 horizontal milling machine; A242 duplex milling machine; A42 profile milling machine; A245 fluid feed milling machine.

Oster Mfg. Co. 216
No. 601 turret lathe with electric power feed to turret.

Parker-Majestic Inc. 415
Semiautomatic internal, external grinder; rotary surface grinder; standard No. 2 surface grinder; special surface grinder No. 2-Z.

Peerless Machine Co. 322
18 x 18-in. vertical hydraulic sawing machine; 11 x 11-in. Hydra-Cut sawing machine; 10 x 10-in. standard sawing machine. 3-speed; 6 x 6-in. Speedy-Cut sawing machines. 2 and 3-speed models. 7 x 7-in. Mechani-Cut automatic bar feed conveyor. Tru-Tooth blade grinder.

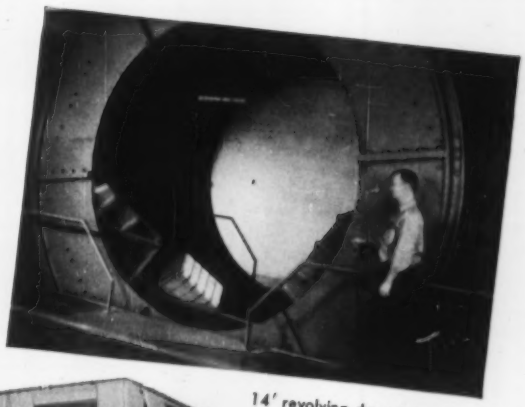
Penton Publishing Co. 220

Pope Machinery Corp. 117
R-2 Super-Precision boring machine. Precision spindle display includes: 1800-rpm motorized grinding spindle; 54,000-rpm motorized spindle, heavy-duty boring spindles; motorized, cartridge-type, 3600-rpm spindles; foot-mounted, belt-driven spindles and belt-driven, cartridge-type internal grinding spindles.

Pratt & Whitney Division, Niles-Bement-Pond Co. 1219
Jig borers: Models 1E, 4E, 3B and a Numerically-Controlled jig borer. Lathes: 16 x 54-in. model "C"; 16 x 54-in. B; Keller model "C"; 3-U P&J; 4-U P&J; 6-DRE-40 P&J automatic turret lathe. 2E vertical precision hole grinder. 2B universal die sinker; 3C die sinker. Velva Trace automatic milling machine. Vertical die and surface grinder. 24-in. optical rotary table; 42-in. rotary table with automatic positioning; 48-in. rotary table. R-8 Keller cutter grinder. Sigmatic automatic gaging machine; automatic machine control gage.

Production 214

Incline impact tester



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Vibration tester

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When General Box designs and tests a container for your product, there's little room left for guesswork about its behavior. Some of the reasons are illustrated above. How it will handle in your plant, how it will pack, how it will ship, and how it will arrive and unpack are all considered.

General Box design engineers know the importance to you of every possible saving in packing, shipping, and direct container costs. And every month they design containers for all kinds of things—machine tools that weigh several tons . . . "hard to pack" products like radar antenna . . . major appliances . . . component parts in bulk.

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Factories: Cincinnati; Denville, N. J.; East St. Louis; Detroit; Kansas City; Louisville; Milwaukee; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston.

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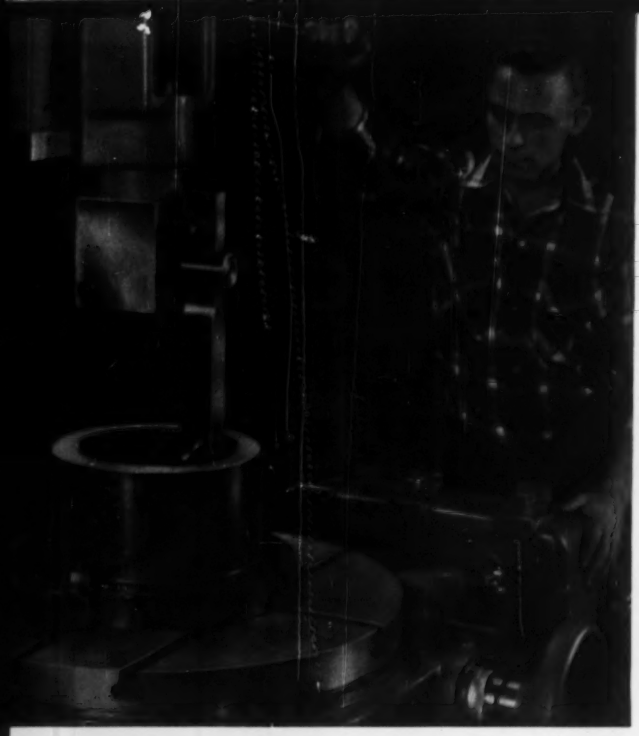

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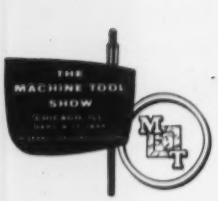
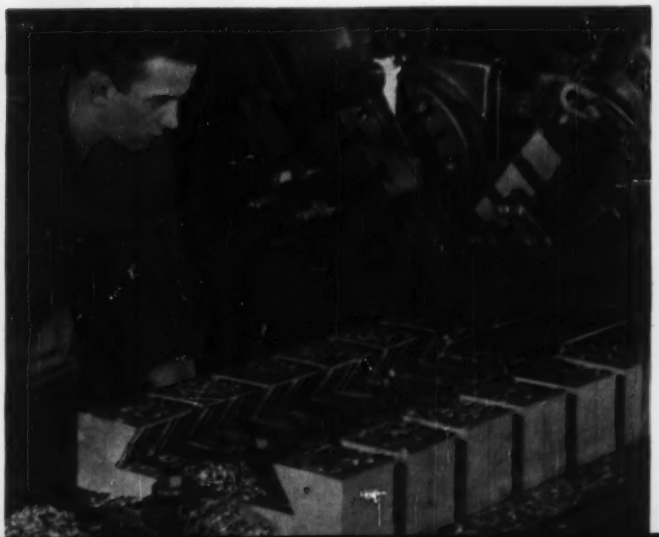
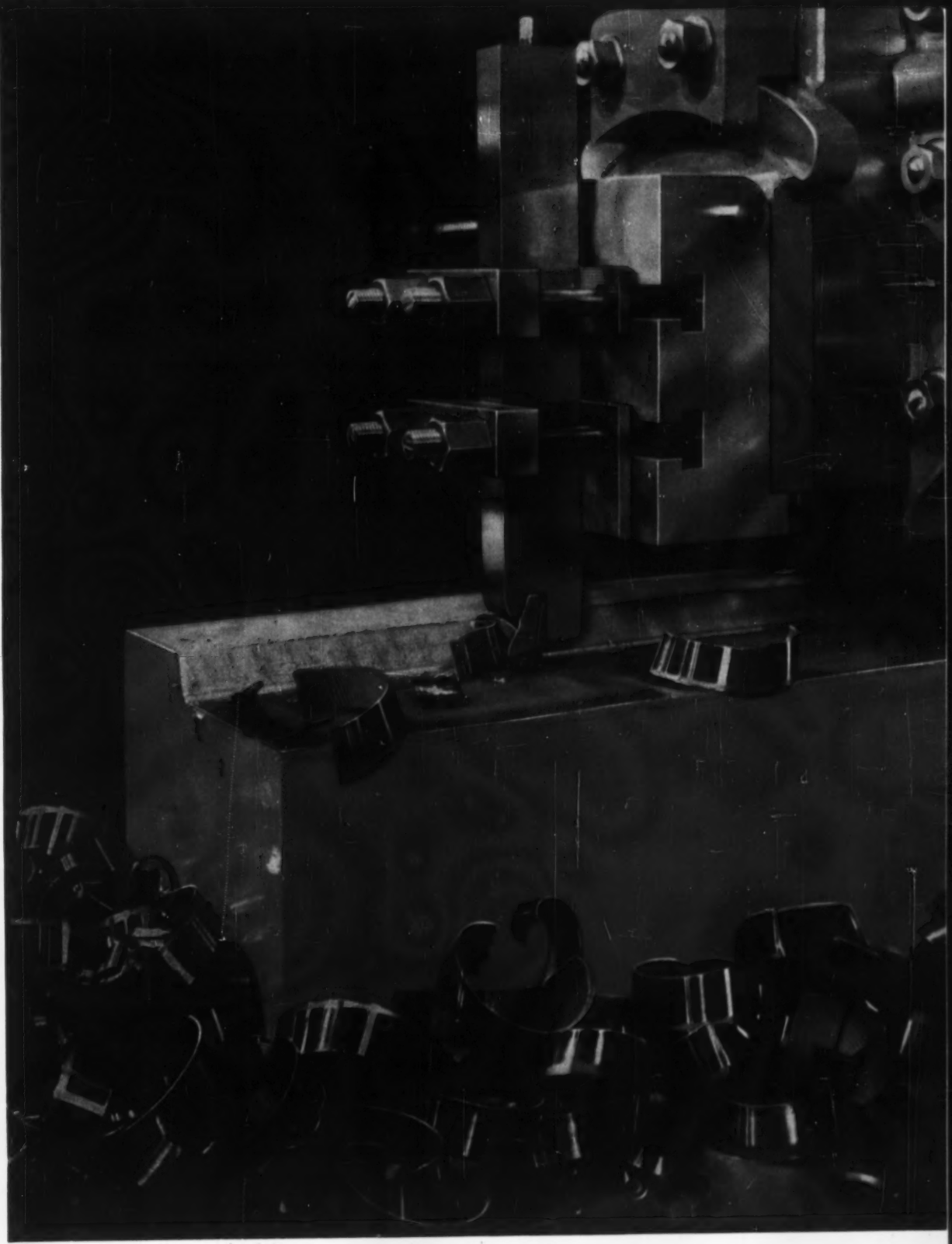


See the latest "Hydraulic" cost-cutting machines, including the Triple-Circuit Planer, in action, at the "Hydraulic" Booth—No. 1423 Machine Tool Show.





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This American MonoRail Monotractor unit, recently installed in a rug and carpet warehouse, dispatches hard to handle, big bulky loads over a wide area. Fully automatic, with finger-tip control, with a hoist capacity of 1,000 pounds, this installation is SAVING 200 MAN HOURS PER WEEK.

This is another of the many examples of American MonoRail engineering for low-cost, efficient overhead handling. Let your American MonoRail representative explain the versatility, low cost and low maintenance of American MonoRail equipment. Consultation in connection with any handling problem is available without obligation.

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EXHIBITORS

Racine Hydraulics & Machinery Inc. 102
Metal cutting machines: Model W-3B, 3-speed; model 816, 2-speed; model 6-C with 14-ft A.S.F.; model 60-C with hydraulic chuck; model 30-C with hydraulic chuck; model 41-C. Display table of hydraulic cutaway units.
Reed Rolled Thread Die Co. 703
Rehnberg-Jacobson M. . Co. 505
Reid Bros. Co. 108
6 x 18-in. precision surface grinders, models 618-PF, 618-PT and 618-HF.
Rivett Lathe & Grinder Inc. 805
Model 1020S "Steelway" precision toolroom lathe; model 918SL "Steelway" cabinet lathe; model 918ST "Steelway" turret lathe; model 1AL armature turning lathe. Model 1024 internal and universal grinders; model 84 internal-external grinder. Rivett spring-tempered collets, thread tool and lock jaw clamp.
Rockford Machine Tool Co. 1423
Openside hydraulic planer; Rockford hydraulic shaper-planer. 24-in. special, ram-type hydraulic shaper; openside hydraulic shaper. "Kopy-Kat" duplicating unit. Rockford hydraulic slotter, model 8A.

Screw Machine Engineering 111
Seneca Falls Machine Co. 1013
Automated model LR Lo-Swing lathes; Model LN platen automatic Lo-Swing lathe; Automatic LO-Swing IMP lathe with rotary loader; model AP tracer-type Lo-Swing lathe. Model DM automatic drilling and reaming machine; model WD Waydrill production unit; automated model CS Lo-Swing drilling and centering machine.
Sheffield Corp. 1305
Thread and form grinders; annular form grinders; gear and spline chamfering machines; gear and spline deburring machines; Micro-Form grinders; Crushtrue wheel dressing devices; gear grinders; automatic point-type welding machines; threading machines; taps, dies, dieheads; pipe cutoff machines; ultrasonic machine tools. Precisionaire instruments and gages; adjustable snap gages; bearing gages; Micronair gages; yarn imperfection indicators and counters; fixed gage and inspection instruments. Automatic and semi-automatic gaging, classifying and segregating machines; noncontact x-ray gages.
Sidney Machine Tool Co. 1116
20-in., model 32 herringbone-geared-head lathe with hydraulic fluid tracer unit; 20-in., model 32 herringbone-geared-head, heavy-duty engine lathe; 16-in., model 32 herringbone-geared-head, toolroom lathe; 16-in., model 16 herringbone-geared-head, heavy-duty engine lathe.
Snow Mfg. Co. 213
Automatic hopper-feed nut tapping machines; vertical drilling, tapping and threading full universal machines; angular automatic burring machine; horizontal hopper-feed rivet drilling and tapping machine.
Snyder Tool & Engineering Co. 1222
Scale models of special metalworking machines include: Car wheel boring machine; palletized transfer machine; long straight-line transfer machine; short straight-line transfer machine; connecting rod balancing machine; large boring and facing machine; six-station center column machine; segmented inline transfer machine; seven-station trunnion machine; six-station rotary index machine.
Socony-Vacuum Oil Co. 314
Springfield Machine Tool Co. 612
No. 2A TR vertical universal grinder. 16-in. model "S" TR lathe; 16-in. series 280 hydraulic contouring lathe; 16-in. series 280 hydraulic reproducing lathe.
STEEL 220
A Penton publication.
Springfield Machine Tool Co. 612
Model 55 Rigidmil; model C1 hydraulic feed Rigidmil; model C3 mechanical-feed Rigidmil; contour milling machine. Model 8A automatic lathe with Multi-Cycle tracer control slide; model 14 Multi-Cycle single-point production lathe. Single end milling and centering machine.
Sun Oil Co. 112
Cutting oils, lubricating oils, hydraulic oils, greases and solvents.
Sweet's Catalog Service 206

Taft-Peirce Mfg. Co. 811
No. 1 precision surface grinder; 6-in. rotary surface grinder; 24-in. rotary lapping machine; back spot facing attachment. Grinder accessories; magnetic chucks, parallels and V-blocks; fixed gages; air gages; small tools and fixtures.
Thompson Grinder Co. 1407
Type CXV 36 x 36 x 120-in. double-head way grinder; type "B" 12 x 12 x 20-in. Truforming grinder; type "2F" 8 x 10 x 24-in. hand-feed surface grinder; 6-in. twin rotary production surface grinder; type "D" 6 x 10 x 18-in. surface grinder; model "G" 12 x 16 x 36-in. hydraulic surface grinder.

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CORROSION
BEFORE
it starts
ESCO 0.03 MAX. CARBON STAINLESS CASTINGS
STOP CORROSION...EVEN AT THE WELD
Most castings must be welded to component parts during installation. This usually means "carbide precipitation" and resultant corrosion along the weld, unless unit is heat treated—an always difficult, sometimes impossible job.
ESCO 0.03 Max. carbon castings can be welded into working position without loss of corrosion resistance—even at the weld. Result: Dependable corrosion-resistant operation. A definite cut in operating costs.
ESCO will produce to your specifications one casting or an entire installation. Spuncast®, Shellcast and conventional casting facilities are available. Write for details.
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712 Porter St.
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ESCO International — New York Office
at 420 Lexington Ave., New York City, or
Portland Manufacturing Plant
Other Offices and Warehouses
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Eugene, Oregon
Salt Lake City, Utah
Honolulu, Hawaii
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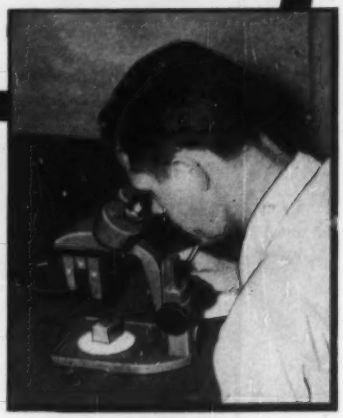
FERROUS AND NON-FERROUS CENTRIFUGALLY CAST ROLLS, SLEEVES, TUBES, LINERS, CHUTES, RETORTS, RINGS, BUSHINGS, BEARINGS, ETC.



Many concerns are discovering strong, uniform, closely grained Sandusky centrifugal castings are essential to applications requiring maximum strength and extreme resistance to heat, corrosion, and abrasion. Chief Sandusky continuous research is ever expanding the range of these uses.

This versatility and quality results from constant research and testing in our modern firm and independent laboratories. Vast foundry and field experience also assists in supplying the proper castings for you.

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Chief SANDUSKY CENTRIFUGAL CASTINGS

FERROUS AND NON-FERROUS

SANDUSKY FOUNDRY AND MACHINE CO., Sandusky, Ohio

EXHIBITORS

The Tool Engineer 105

U. S. Tool Co. Inc. 215
No. 33 and No. 28 U. S. Multi-Slide machines. MM-1-D U. S. Duplex Multi-Miller.

Van Norman Co. 905
Ram-type millers: No. 16L, No. 16M, No. 24L, No. 24M, No. 28 and No. 38M. Diversimatic centerless grinder No. 418; plain cylindrical grinder; oscillating radius grinder; single-head plunge cut grinder; double-head plunge cut grinder.

Vickers Inc., Division of Sperry Rand Corp. 814
Hydraulic power units and components for machine tools.

Warner & Swasey Co. 717
Contour tracing attachment, 4A, 3A, 2A and 1A heavy-duty saddle-type turret lathes; No. 3 universal ram-type turret lathe; No. 1 and No. 3 Electro-Cycle ram-type turret lathes; 16-in. Electro-Cycle turret lathe. No. 11 RD and No. 10 tapping and threading machines. 1 AC and 2 AC single-spindle automatic chucking machines. Multiple-spindle automatic bar machines. Turret lathe tools; progressive step turner. Probograph measuring machine.

Wiedemann Machine Co. 1420
Turret punch presses: 4-ton RA-4P press; 40-ton RA-61 press; 15-ton RA-41 press; 40-ton R-61 presses; 15-ton R-44 press; 7½-ton R-2 presses.

Wysong & Miles Co. 913
10 x ¼-in. power squaring shear; 72 in. x 16-gage air power shear; 72 in. x 14-gage motor-driven shear; 52 in. x 12-gage motor-driven shear; 48 x ⅜-in. motor-driven shear. 5 x 48 in. all-steel bending roll.

PRODUCTION ENGINEERING SHOW

Navy Pier

Adamas Carbide Corp. 445
Thro-Way toolholder for carbide throw-away inserts; Adamas throw-away carbide inserts.

Airborne Instruments Laboratory Inc. 531

Aircraft-Marine Products Inc. 447
AMPlivar splices. T-head hand tool. Termalum and Copalum terminals. Dyna-Cr'mp tooling. AMP-O-Mation terminations for printed circuit components. Universal patchcord programming systems.

Alar Design Inc. 575
Small jigs and fixtures, electro-mechanical control, small intricate parts and variable speed transmission.

Alemite Division, Stewart-Warner Corp. 416

Allen-Bradley Co. 244
Phase failure and phase reverse relay; visible blade disconnect switch; oiltight limit switches; motor control equipment.

Louis Allis Co. 119, 120
Adjustable speed drives: Ajusto-Spede; Select-A-Spede; and Electronic Select-A-Spede. Special motors; LA line of electric motors built to new NEMA standards; Louis Allis-Foote Bros. Gearmotor and integral brake motor.

Aloris Tool Co. 345

American Actuator Corp. 465

American Machinist 807, 808

American Sip Corp. 101

Ampco Metal Inc. 516
Ampco metal in sand and centrifugal castings; C-process castings; mill products—extruded solid and hollow rounds and shapes, sheet and plate, tube, forgings and fasteners; Ampco-Trode, Phos-Trode, Mang-Trode bronze welding rods in coated, coiled and filler rod forms; Ampco-Weld resistance welding bars and rods, tips, wheels and accessories. Ampco centrifugal pumps.

Apex Tool & Cutter Co. 855
Sellers lathe axle journal tools; universal radius grinding fixture; double serrated tool bits and holders.

Edward Segal Machinery Atlas Tack Corp. 847
Eyelet attaching machinery. Eyelets and other fasteners.

AUTOMATION 132
A Penton publication.

Balance Engineering Co. 436
Static and dynamic balancers, horizontal type; static balancer, vertical type.

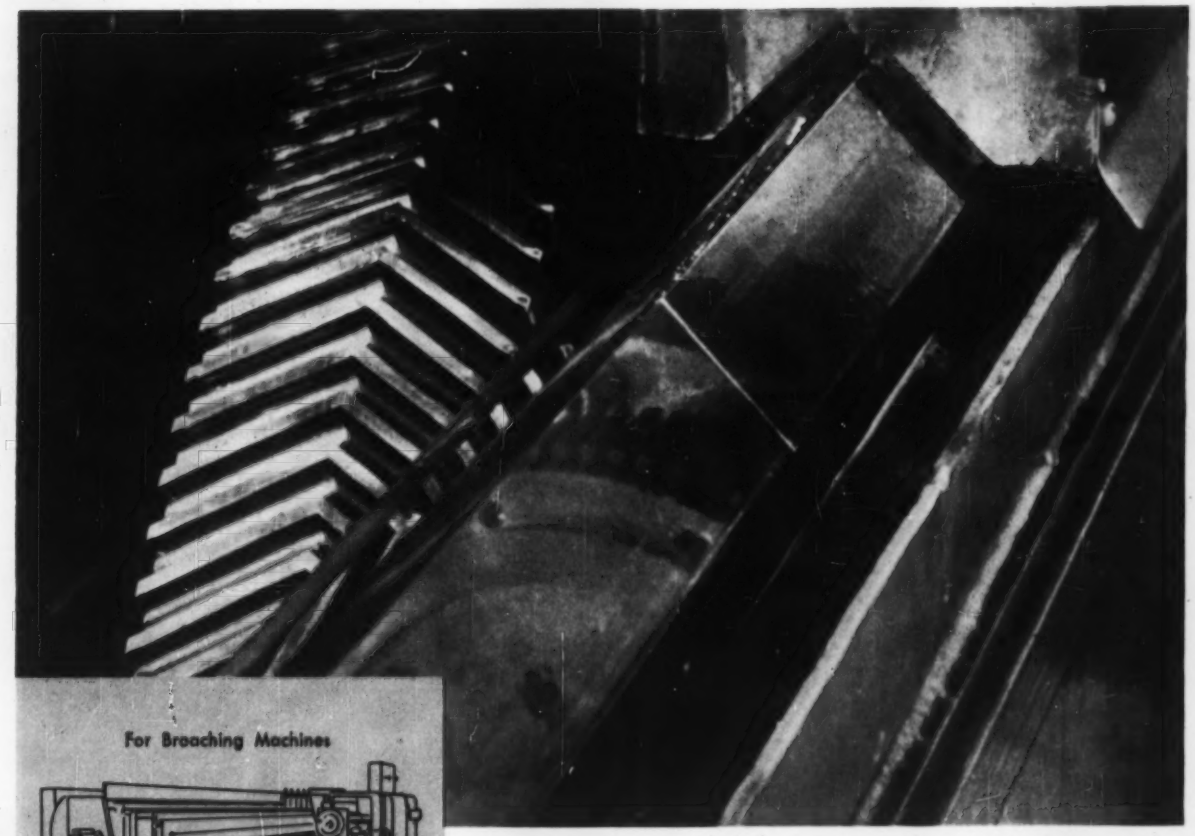
Balcrank Inc. 437
Counterbalanced handwheels; solid and revolving spindle-type handles; counterbalanced cranks; compound rests; clamping levers.

Barrett-Cravens Co. 452

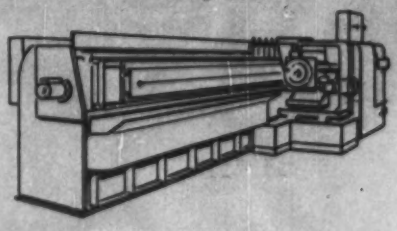
Barry Controls Inc. 153
Leveling Barrymounts and Spring Mount machinery mounts; mounts for shock and vibration in the electronics, aviation, marine and packaging fields.

Bill-Dee Corp., Automation Products Division 475

G. S. Blakeslee & Co. 441
Solvent vapor degreasing equipment. Blacosolv degreasing solvent.

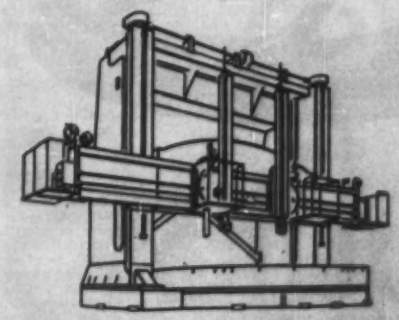


For Broaching Machines



For Heavy-Duty Lathes

For Boring Mills



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The backbone in Farrel® herringbone gears, formed by the meeting of the two helices without a center groove, puts the *entire* face width of the gear to work. Benefit: Higher load-carrying capacity in less space—especially important in machine-tool applications. The opposed helices balance and absorb axial thrust within the gear member, preventing harmful thrust load with consequent stresses on other parts of the machinery.

The Farrel-Sykes method of gear generation assures extreme accuracy of tooth spacing, contour and helix angle. Benefit: Smooth, uniform power flow. Backlash is reduced to a minimum and the load is distributed evenly across the entire face width.

If you have a gear problem let us hear about it. Benefit: The assistance of engineers experienced in the design of gears for a wide variety of machine-tool applications.

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Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

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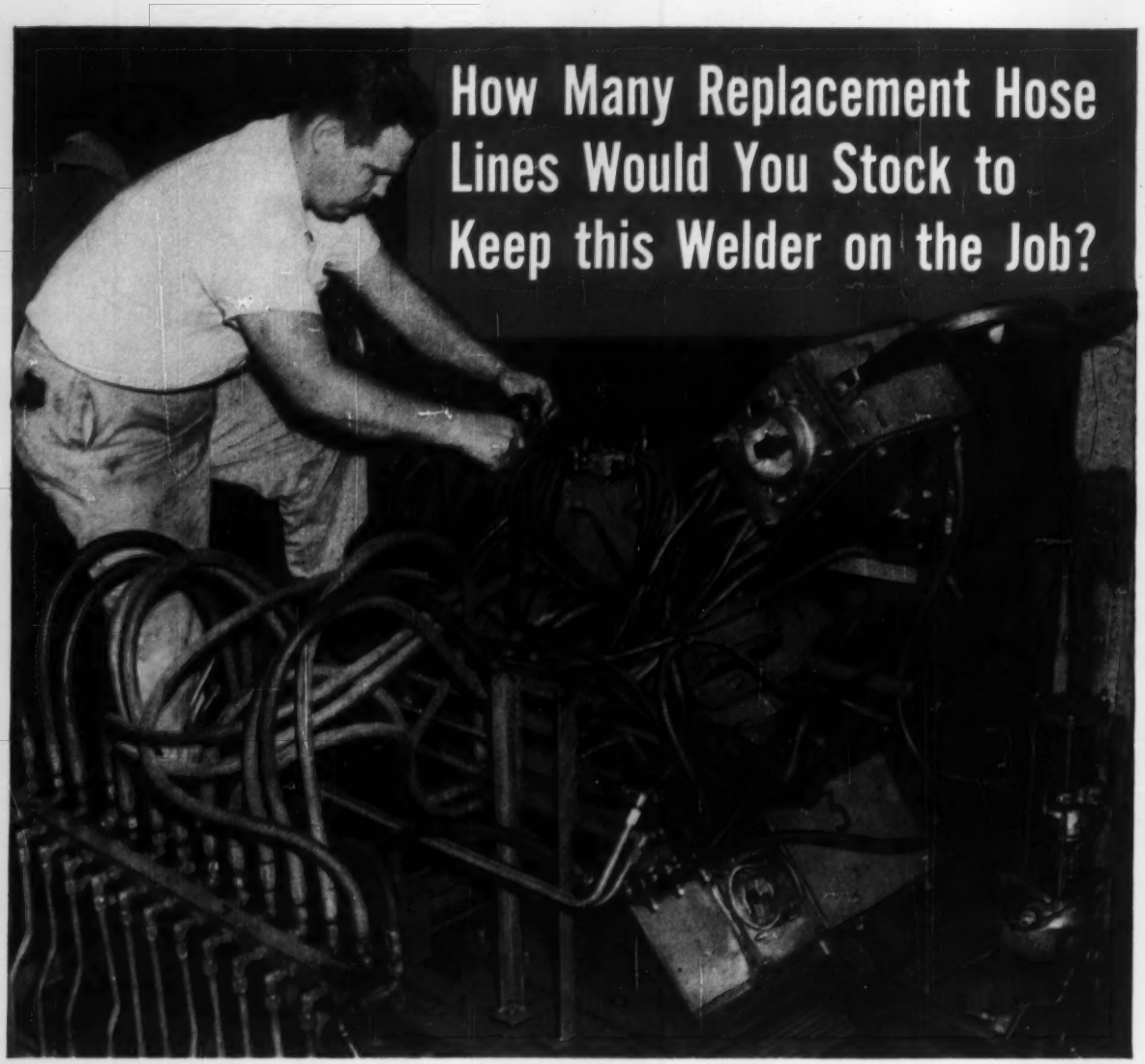
FB-1030

How Many Replacement Hose Lines Would You Stock to Keep this Welder on the Job?



At General Electric's Major Appliance Division in Louisville, Ky., this resistance welder fabricates cooking range bodies. 160 hydraulic lines are used on the equipment that positions each range body as it feeds through the welder.

G. E. maintenance men can replace any worn hose line from a surprisingly small supply of Aeroquip bulk hose and reusable fittings. It takes only minutes to assemble the hose and fittings using ordinary shop tools.

In your plant, too, the Aeroquip bulk hose method can save replacement time and eliminate the need for stocking pre-assembled hose lines. Check your Yellow Pages for your local Aeroquip distributor or write us.

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EXHIBITORS

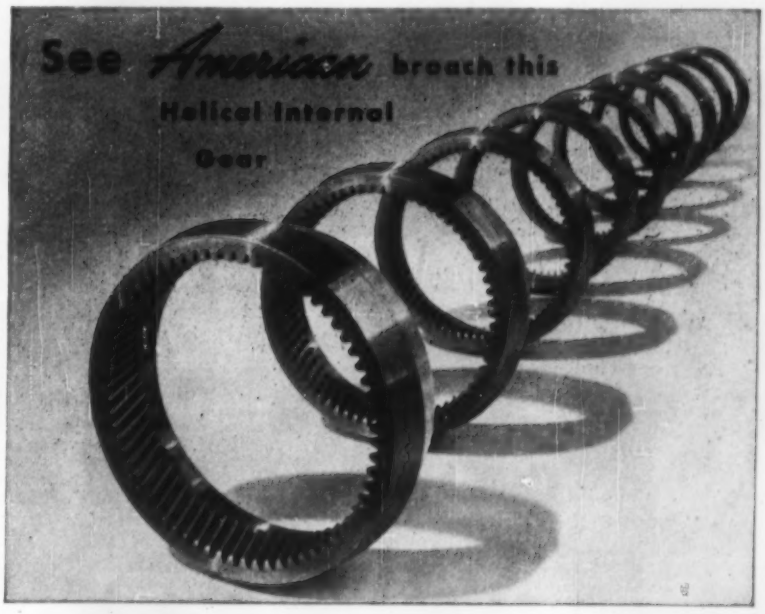
Boice Mfg. Co. Inc. 826
Full line of snap gages, bore gages and masters, including the Dial Snap Gage Setmaster, model 10.300 Adjustable Master and model 985 fully adjustable large diameter gage.
Boston Gear Works 110, 644
100-series line of Ratiomotors and Reductors and Flanged Reductors. Power transmission equipment: Spur gears, miters and bevels, helical gears, worms and worm gears, sprockets and chain, universal joints, couplings, pinion and rack. Bost-Bronz bearings (oil-impregnated), Bear-N-Bronz bearings (solid bronze), pillow blocks, flanged cartridges, shaft supports and Nice ball bearings.
Bristol Co. 640
Socket screw products: Setscrews, capscrews, flat-head capscrews, stripper bolts, pipe plugs and keys, in both hex and multiple-spline sockets and in alloy and stainless steel.
Brooks Equipment & Mfg. Co. 528
Buck Mfg. Co. 141

C. I. T. Corp. 512
Machinery financing clinic.
Carboloy Dept. of General Electric Co. 665, 667, 669, 670, 765, 767, 769, 770
Machinability computer. Tool holders for throw-away carbide blanks. Carbide-surfaced steel parts, surfaced by new process. Oxide base cutting tool material. Complete line of carbide cutting tools including 350 and 370. Improved lines of carbide broaching, planer and helical blanks. Line of carbide throw-away blanks; line of carbide on-end insert blanks. Carbide wear resistant applications for machines. Pressed dies (carbide).
Century Electric Co. 418
Flange-mounted motor; totally enclosed, fan-cooled fractional and integral horsepower motors. Century selective speed unit.
Challenge Machinery Co. 529
Granite surface plates; Semisteel layout surface plates, welding tables, reading tables, checking tables, bench plates, rectangular and round lapping plates, straight edges; adjustable floor plates; bench blocks; universal right angle irons; angle plates; universal box angles; box parallels; V-blocks; parallel straight edges; work benches.
Chemical Development Corp. 541
Devcon, a combination of 80 per cent steel and 20 per cent plastic.
Chicago Dial Indicator Co. 525
Chicago Rivet & Machine Co. 147
Automatic riveter; single and multiple setters.
Chicago Wheel & Mfg. Co. 854
Clark Controller Co. 840
Type PM relay for machine and press; control center for motor starters; type PV press air valve; magnetic amplifier packaged speed control; type DM heavy-duty limit switch. Standard line of AC starters and accessories.
Clark-Cutler-McDermott Co. 251
Air-Loc antivibration machine pads.
Cleveland Instrument Co. 817
Collins Microflat Co. 455
Microflat black granite surface plates in two and four clamp ledges; black granite layout plates; angle plates, parallels and straight edges.
Commercial Filters Corp. 811
Control Engineering 807, 808
Cooper-Weymouth Inc. 444
Copy-Craft Inc. 549
Ormig super universal systems machine. Ormig universal line selection machines. Ormig universal column shifting machine. Ormig universal bookkeeping machine.
Crucible Steel Co. of America 830, 831, 832
Cushman Chuck Co. 419, 420, 421
Accra-Set chucks; air-operated screw adjustable jaw chucks; 3-jaw, scroll-operated compensating chuck; air-operated compensating chuck.
Cutler-Hammer Inc. 423, 424
Line of heavy-duty, oil-tight pushbuttons and indicating lights; line of relays, magnetic contactors and starters. Unitrol sectionalized motor control center. Combination starters; manual across-the-line starters.

Delco Products Division, General Motors Corp. 523
DeVilbiss Co. 155, 156
Horizontal and transverse models of automatic spray finishing machines; catalyst spray guns; hot-spray process equipment; general spray gun assortment.
Diehl Mfg. Co. 429
Flat-type motor for close-coupled machine tool applications; open, drip-proof motor; totally enclosed, fan-cooled motor; shaftless motors; power transmitters (integrated touch-brake motors). Servomotors, tachometers, servomotor-tachometer combinations. Miniature, combination servomotor and a-c tachometer generators.
DoAll Co. 407
Gage blocks, cutting tools and industrial supplies. Bausch & Lomb contour measuring projector, bench projectors and toolmakers' microscopes; tubular micrometers, plug and ring gages, granite surface plates and granite accessories.
Drillmation Co. 446
Dumore Co. 547
Series 24 automatic drill unit; Hi-speed drilling equipment. Toolpost grinders; hand grinders; flexible shaft tools.
Durant Mfg. Co. 151
6-Y-1-2-MF electric panel counter with key reset; 5-H-1-1-R, 5-D-1, 4-C8-1-R and "Y" series stroke counters; "H," "D" and "C8" rotary counters; 5-R-1-Q predetermined counter with quick lever reset; 4-5-N-16-1 predetermined counter double deck; 5-8P-1-1-R small predetermined counter, stroke; 5-8P-7-1-R small predetermined counter, rotary; 6-Y-1-MF electric counter; 6-C8-1-MF electric counter; micrometers, stroke and rotary.
Eagle Signal Corp. 146
Eastman Kodak Co. 413, 414
Contour projectors.
Electro Dynamic Division, General Dynamics Corp. 341
Emeco Corp. 112
Draftsman's posture chair; Modular draftsman's desk.

Encyclopaedia Britannica 833
Equipto Division Aurora Equipment Co. 440
Steel shelving. Toolroom equipment. Hand trunks. Clothing lockers. Work benches. Drawer cabinets.
Errington Mechanical Laboratory Inc. 249
Auto reverse tappers; fixed-center multiple drill heads; adjustable drill heads (all gear); universal joint adjustable drilling and tapping heads; drill and tap units.
Ettco Tool Co. Inc. 527
A.T.U. No. 3 lead-screw tapping machine; Circle-Type Flex-Shaft spindle multiple heads; Straight-Line Type Flex-Shaft multiple heads; fixed-spindle and geared adjustable spindle multiple heads; high-speed sensitive tapping attachments; automatic and semiautomatic single and multiple tapping machines; electric index fixtures; tap and drill chucks.

Fafnir Bearing Co. 131
Machine tool ball bearings; cutaways of machine tool bearing applications. Fafnir torque tester for instrument bearings.
Fairbanks, Morse & Co. 442



AT BOOTH 1412 — MACHINE TOOL SHOW

American broaches the I.D. and 68 internal gear teeth in this 5½ inch diameter automotive transmission gear . . . does it fast and economically. You are cordially invited to see the machine and tooling in operation, as one of the many outstanding features of the Sundstrand and American Broach section at the show.

American BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
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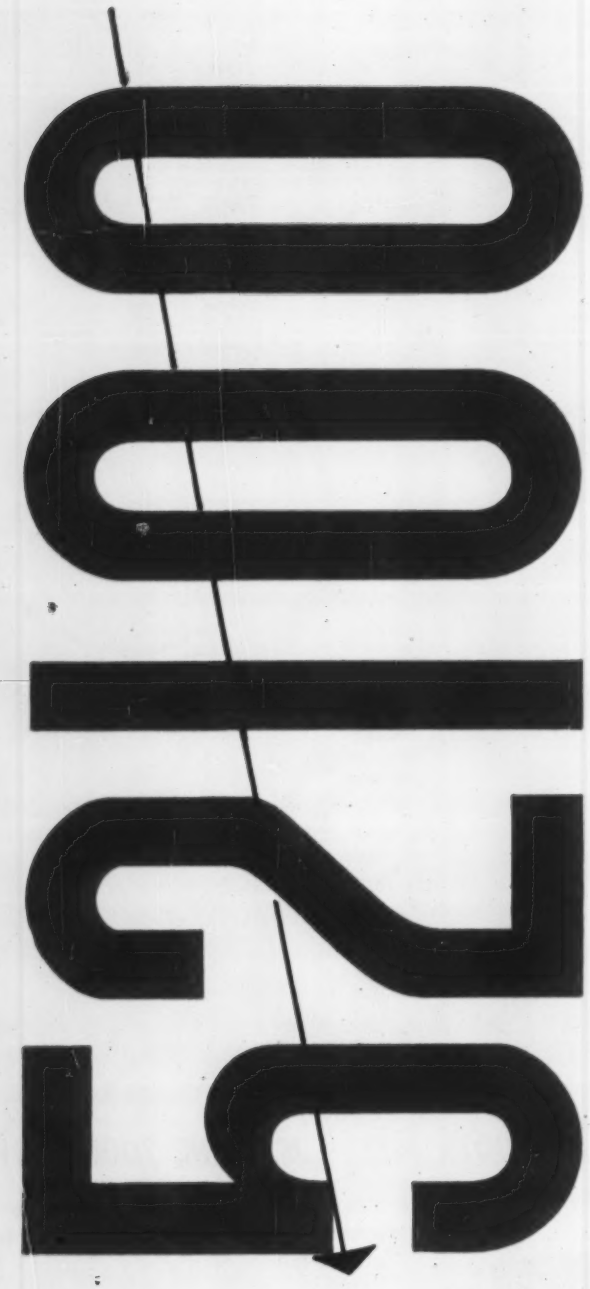
See American First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



TUBES · BARS · FORGINGS · WIRE

PETERSON STEELS, INC.

UNION, NEW JERSEY

Detroit, Michigan • Chicago, Illinois

EXHIBITORS

Farrand Optical Co. Inc. 347
Inductosyn electronic micropositioning device for automatic control, rotary and linear types. Optical tooling for aircraft, power generators, shipbuilding and precision machines.
Ferguson Machine & Tool Co. Inc. 852
Firth Sterling Inc. 538
High-speed steels, tool and diesteels, stainless specialties, high-temperature alloys; Firthite sintered tungsten carbide tips, blanks, tools, dies and wear parts. Thriftool mechanical toolholder. Chromium carbide, heavy metal, zirconium and cermets.
Formsprag Co. 432
Formsprag full complement clutches for all overrunning applications.
FOUNDRY 132
A Penton publication.
Franklin Control Corp. 342
Furnas Electric Co. 749
Gear Grinding Machine Co. 511
Rzeppa constant velocity universal joints.
General Box Co. 532
General Electric Co. 107, 108, 109
Graham Transmissions Inc. 540
Speed corrector drive; high-speed, high-torque drive. Automatic control for machine tool feeds.
Green Instrument Co. Inc. 548

Hamilton Automation Inc. 810
Hamilton shuttle hand; Hamilton press hand.
Hamilton Mfg. Co. 751, 752
Auto-Shift drawing tables; Unit System Planfiles.
F. Ward Harman Associates 113
Harnischfeger Corp. 129
Hevi Duty Electric Co. 252
13-kw conveyor furnace. Control circuit transformers.
Hillyer Instrument Co. Inc. 427
Automatic positioning "building blocks" on locating machine; Tape-fed programmer on model LD24 automatic locating and drilling machine.
Hi-Lo Tool Products Co. Inc. 878
Holo-Krome Screw Corp. 431
Socket head cap screws, flat head socket cap screws, button head socket cap screws, socket setscrews, socket pipe plugs, socket shoulder screws, socket screw keys and dowel pins.
Horton Chuck Division
E. Horton & Son Co. 836
Controlled centering pressure chuck; Tru-Set chucks; Windsor independent and universal chucks.
Hyatt Bearings Division
General Motors Corp. 519
Roller bearings—cylindrical, barrel and taper.
I-T-E Circuit Breaker Co. 111
Illinois Metal Products 165
Imperial Stamp & Engraving Co. 825
No. 110 heavy-duty, hydraulic marking machine; No. 115 light-weight, hydraulic marking machine. Flat and roll stamps, screw machine holders for marking on automatic screw machines, automatic numbering heads and other marking equipment.
Industrial Diamond Association of America 139
Industrial Garment Service 352
International Nickel Co. 814
Jacobs Mfg. Co. 104, 105
Drill, tap and collet chucks; Rubber-Flex collets.
Charles L. Jarvis Co. 639
Jones & Laughlin Steel Corp. 741
Cold-drawn extruded shapes.

Kennametal Inc. 410, 411
Grade K21 cutting material; 17 styles in a range of sizes in Kendex cemented carbide tooling. Tool grinding service.
Koebel Diamond Tool Co. 526
Kux Machine Co. 121, 122
Model HP-20 die casting machine. Model 4100, hydraulic powdered-metal press.
Lapeer Mfg. Co. 510
LaSalle Steel Co. 133, 134
"Fatigue-proof" free-machining steel bar; "Stress-proof" cold-worked, furnace-treated steel bar.
Leetronics Division of Lee Spring Co. Inc. 157
Rotary-type, industrial solenoids on machine tools, relays, counters and programming switching.
Lehmann Boring Tool Division Fulton Iron Works Co. 569
Various styles of block-type boring bars, adjustable block cutters, solid-block cutters, cutter blades of high-speed steel, Stellite, tungsten carbide tipped. Standard boring bar accessories.
Leland Electric Co., Division of American Machine & Foundry Co. 349
Linemaster Switch Corp. 552
Link-Belt Co. 433, 434, 435
P.I.V. variable speed drives with hydraulic, electronic and pneumatic controls. Ball bearing trolleys for overhead conveyors; ball and roller bearings, babbitted bearings and take-ups; roller and silent chain, locknuts and washers, KC and geared flexible couplings and worm and parallel shaft gear drives. Flex-

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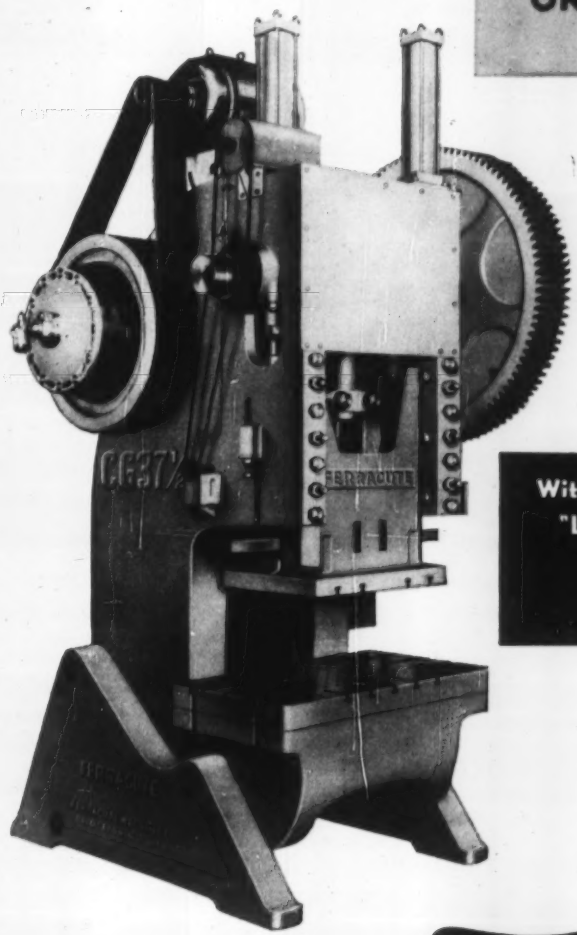
BUILT TO JIC STANDARDS



With air-powered, electrically controlled "L.K." style FRICTION CLUTCH with interconnected brake and single-point adjustment . . . .

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"One day we were using 14 hand sprayers ...the next day, 2

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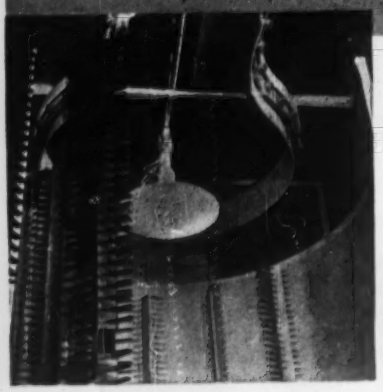
RANSBURG NO. 2 PROCESS

Electrostatic Spray Painting

And, in this instance * production was increased, quality of the work improved, and rejections cut to practically nothing.



*Fluorescent Fixtures of California, in their modern plant in South San Francisco, uses the Ransburg No. 2 Process Reciprocating Disc Atomizer to paint their popular line of ALL-BRITE lighting fixtures. The quotes above are from Works Manager, R. H. Shaffer.

Regardless of the type of product you manufacture, if it's painted... and, if your production justifies conveyorized painting, you should look into the savings (and improved quality) which can be yours with one of the Ransburg Electrostatic Painting Processes. May we tell you about complete Ransburg services?

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Indianapolis 7, Indiana

RANSBURG

EXHIBITORS

mount oscillating conveyors; screw conveyor; piano-hinged apron conveyor; drag chain conveyor.

Lufkin Rule Co. 572

MACHINE DESIGN 132
A Penton publication.

Magnaflux Corp. 820
Nondestructive testing equipment.

Marathon Electric Mfg. Co. 509

Marlin-Rockwell Corp. 536
Ball bearings including superprecision bearings for high-speed machine tool spindle applications.

Marvel Engineering Co. 809

Master Electric Co. 123, 124
Electric motors, gearmotors, Unibrake motors, fluid-drive motors, shell-type motors, totally enclosed fan cooled square frame motors. Mechanical and electronic Speedranger variable speed drives.

May-Fran Engineering Inc. 448
"Chip-Tote" conveyors.

Meiard Mfg. Corp. 448

Merkle-Korff Gear Co. 841, 844

Micrometrical Mfg. Co. 651
Profilometer surface roughness measuring instrument; Anderometer vibrations tester; Wavometer for measurement of waviness on small, symmetrical surfaces of rotation; Rotary Pilotor surface roughness tester; Proficorder tracing instrument.

Micro-Poise Engineering & Sales Co. 114

Midwestern Instruments 140
Models 3 and 4 Servovalves; model 9 torque motor. Recording oscillographs. Tracer head for automatic machines.

Miller Fluid Power Co. 819, 821, 822, 823

Morrison Machinery Co. 346

Morse Chain Co. 340

National Diamond Laboratory 551

National Pneumatic Co. Inc. and Holzer-Cabot Division 439

Nelson Stud Welding Division Gregory Industries Inc. 454
Stud welding demonstration with NS-9 stud welding gun.

New Departure Division General Motors Corp. 537
Precision machine tool bearings and general industrial bearings; adapter, square bore, conveyor, textile, aircraft engine and accessory bearings; Sentri line of self-sealed bearings; typical automotive-type bearings; instrument bearings; precision ball bearings. Ball bearing bouncing exhibit.

NEW EQUIPMENT DIGEST 132
A Penton publication.

New Hermes Engraving Machine Corp. 430
Engravographs engraving machines. Gravoflex flexible laminated engraving plastic.

New Standard Division U. S. Expansion Bolt Co. 813
Kwik-Chek small hole gage; S-N-S lag screw expansion shield. Anchoring devices and allied products.

New York Air Brake Co. 514

New York Belting & Packing Co. 550
Gilmer timing belt drive.

Nilsson Gage Co. Inc. 366

Northwestern Tool & Engineering Co. 847
Holddown tools; jig and fixture components.

Oakite Products Inc. 652

Ohio Metal Working Products Co. 128

O'Neil-Irwin Mfg. Co. 125, 126
8-ton, 24-in. hand-operated press brake; Di-Acro benders; Di-Acro rod parters; Di-Acro punch presses; Di-Acro shears; Di-Acro notchers; Di-Acro spring winders.

Optical Gaging Products Inc. 412
Custom staging fixtures and chart-gages for optical comparators; reticle tracer method of optical inspection; chart and fixture-making materials; dual-image system of optical inspection; standard accessories and chart-gages for all optical comparators; microgage chart-gages for optical comparators. Kodak contour projectors.

Osborn Mfg. Co. 856

Penton Publishing Co. 132

Parker Appliance Co. 418
Hydraulic accumulators. Hydraulic check valves; hydraulic directional control valves. Synthetic rubber O-ring seals; Triple-lok flared tube fittings; Ferulok flareless tube fittings; Hoze-lok hydraulic hose fittings; pressure gage snubber; tube working tools.

Pines Engineering Co. 558
Two-Way bender; size ⅜ automatic bender. End-finishing machine.

Pneuma-Serve Inc. 117
Pneuma-serve screw feeding machines adapted to power-driven hand tools and automated lines.

Potter & Brumfield Mfg. Co. Inc. 641
Complete line of electric relays. Automatic stepping switch.

Product Engineering 807, 808

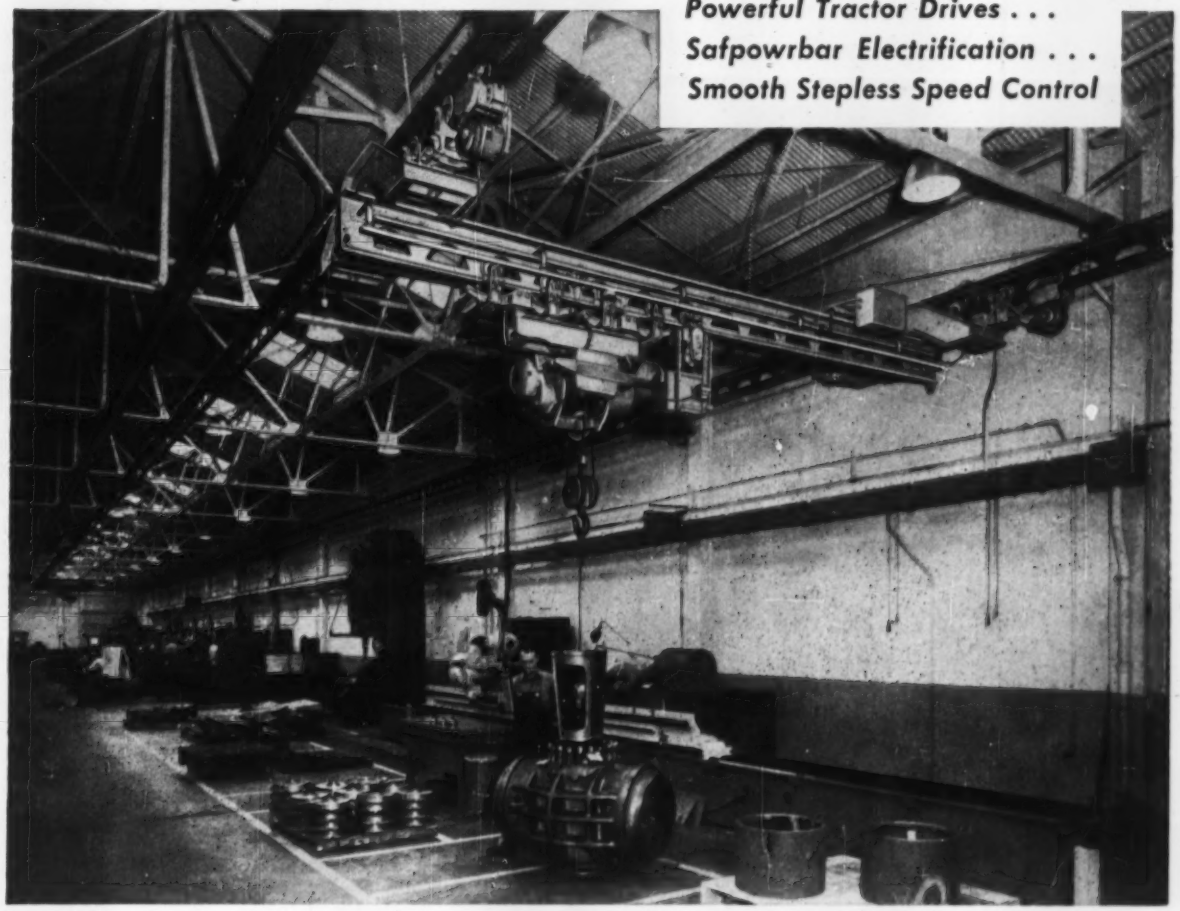
PurOlator Products Inc. 161
High and low-pressure hydraulic filters; lubricating oil filters; air filters.

J. R. Reinertson & Co. 367

Reveo Inc. 673

A *Mighty Fine* 5 TON CRANE

Powerful Tractor Drives . . .
Safpowrbar Electrification . . .
Smooth Stepless Speed Control



HERE IS a modern 5 ton crane that offers you the finest in performance. Completely motorized, this 22'-0" long heavy-duty crane is floor-operated with all motions controlled by the pendant push-button station.

Rugged four-wheel tractor units propel both the bridge and the carrier; two units on the bridge and one on the carrier. The tractors not only have tremendous draw-bar pull for their size, but are easy to inspect and maintain. If ever necessary, a tractor can be quickly uncoupled and replaced by a spare.

Reactor type single-speed control provides unusually smooth acceleration for bridge and carrier drives which have travel speeds of 125 fpm.

Safety-conscious people will find Cleveland Tramrail Safpowrbar electrification on the crane and runway of tremendous advantage. It protects against serious injuries from accidental contact, and of additional interest, the sliding collector shoes have approximately five times the life of collector wheels.

This crane is only one of dozens of types and sizes Cleveland Tramrail has available. So whatever your needs, you can be sure that Cleveland Tramrail is in a position to serve you.

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THE CLEVELAND CRANE & ENGINEERING CO.
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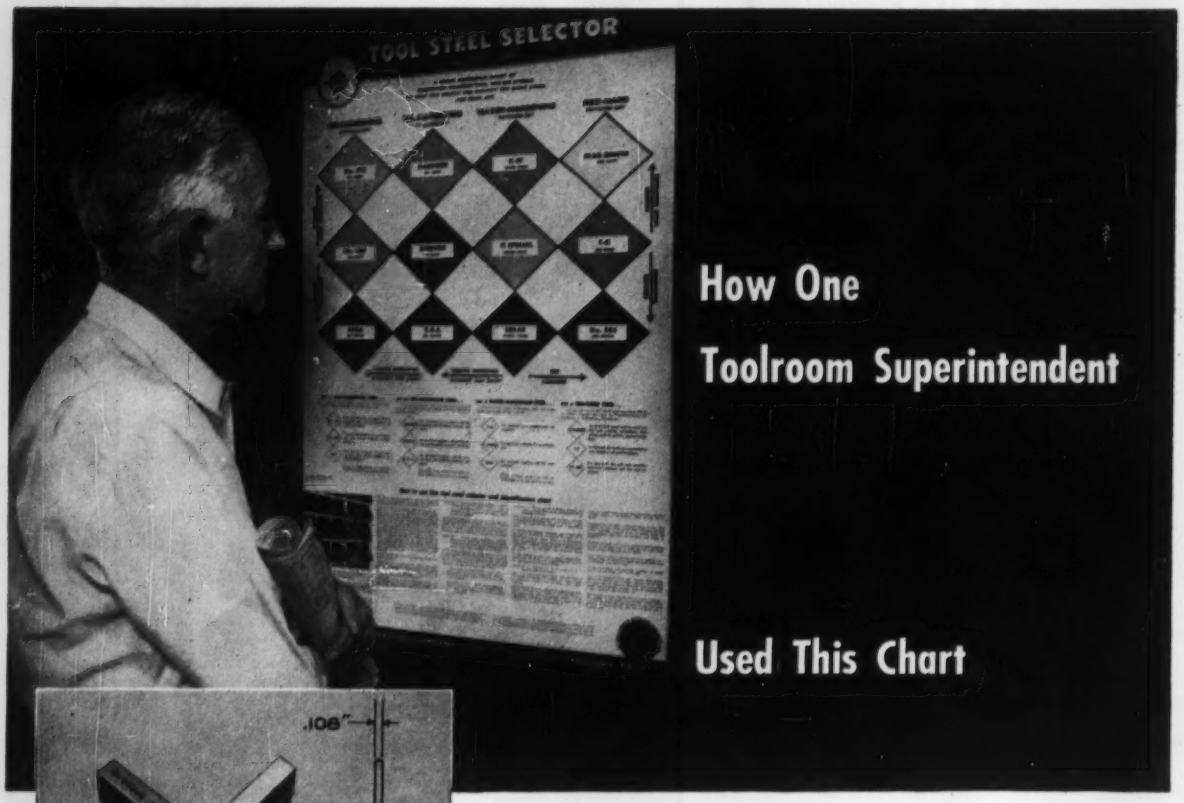
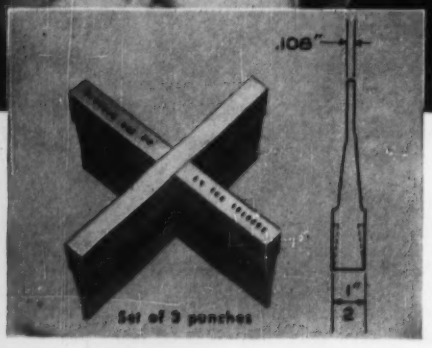
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT





Job: A set of three special punches used on a high speed machine to close the joints on prefabricated metal window frames made from ⅛" thick SAE 1010 steel.

Problem: Many types and grades of tool steels were tried, but all lacked the necessary toughness and hardening safety. Best service life from any before breakage was three days. Because a set of 3 punches cost hundreds of dollars . . . ake, the low production was hiking up operating . . . at a prohibitive rate.

Solution: In a final effort to find a steel with enough toughness and safety in hardening, the Toolroom Superintendent turned to Carpenter and the Matched Set Method. Carpenter R.D.S. (Oil-Tough) was indicated.

Results: Now punches stay in service for about three months, and instead of breaking, they wear out in service.

. . . To Hold Down Operating Costs

In working with many men responsible for tools and dies, we've discovered a simple but often overlooked fact: The man who approaches each tool and diemaking job with the idea of . . . *Simplifying* it, *Reducing* heat treating hazards, and *Improving* previous performance . . . is bound to do a better job.

If you or your men have that approach, Carpenter wants to be of help. We like to think of our association with customers as a "partnership" in a mutual effort to get best possible results. And here's what we offer: Practical, *workable* help at *every step* from diemaking, to heat treating, through on-the-job performance.

And that's why it works . . . both of us have a common goal. Just one example of hundreds is found in the Field Report shown to the left.

One part of this program is the Carpenter Matched Set Method. It is an accurate blueprint for selecting the *one* die steel ideally suited to give you the results you want. It is all outlined in a convenient, full-color Wall Chart available to you.

And that's only a part of the program . . . a program that involves almost 70 years' experience in the development of new and constantly-improved die steels. We're ready to work for you, now. Simply call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor.

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Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

EXHIBITORS

J. A. Richards Co. 474
Multiform benders.
Robinson Aviation Inc. 827
Machinery mounts.
Roller Bearing Co. of America 829
Pitchlign roller bearings; Pitchlign roller followers; sealed Pitchlign roller bearings.
Rowe Machinery & Mfg. Co. 179
Automatic straightening and feeding machines; motor-driven automatic coil cradles; combination cradle-straighteners; roll feeds; sheet fanners.

Safety Socket Screw Co. 824
Blue-Devil Led Lok, vibration-proof, socket cap screw; Blue-Devil socket head cap screws, flat head socket cap screws, socket head stripper bolts, socket pipe plugs, keys and key kits.
Saginaw Steering Gear Division
General Motors Corp. 348
Single-circuit machine-ground and rolled-thread ball bearing screws; multiple-circuit machine-ground and rolled-thread ball bearing screws; safety ball bearing splines.
Schauer Mfg. Corp. 245
Speed lathes.
George Scherr Optical Tools Inc. 864
Optical measuring and inspection equipment including Toolmaker microscopes; Leitz optical master dividing head; Leitz microhardness tester; optical comparators.
Scott Paper Co. 853
Industrial paper wiper.
Scully-Jones & Co. 164
"Safe-Torque" tap drivers; "Safe-Torque" nut runners; "Toolitrol" board and presetting tools; "Torque" meters and flowmeters; recessing tools; cam-type tool ejectors; drill chucks; close center tap drivers and chucks; "JT" lock and eject type compression and tension tap holders; drill stops; "JT" lock and eject type adjustable adapter assemblies; milling machine arbors; "Roll-Lock" and "Better-Hold" mandrels, arbors and chucks; "JT" lock and eject type floating holders.
Shell Oil Co. 154
Skinner Chuck Co. 508
Full line of hand and power chucking equipment. Solenoid electric valve line.
S-P Mfg. Co. 115
Power chucks. Rotating and nonrotating air cylinders; rotating and nonrotating hydraulic cylinders. Valves. Chucking equipment accessories.
Speed Control Division
Fairchild Engine & Airplane Corp. 744
Specon variable speed drives and transmissions, electrical and mechanical.
Sperry Products Inc. 451
Ultrasonic Reflectoscope and RA attachment for continuous inspection of steel strip. Protectron punch press overload detector. Hydraulic Remote Controls single-tube machinery control system.
Spiral Step Tool Co. 772
Carbide and high-speed, special cutting tools.
Square D Co. 404, 405
Stackbin Corp. 148
Materials handling equipment for processing, storage and assembly; Stackbins, Stackracks, stacking pallets, moveable bases, assembly bins, Stackshelving, sectional Stackbins, toolroom equipment, hand trucks, conveyor hangers, bin dividers, top and front covers for Stackbins and special purpose containers.
Standard Oil Co. (Indiana) 464
Standard Pressed Steel Co. 828
Line of superstrength socket head setscrews. Hallowell storage wall units. Line of Flexloc micronuts.
L. S. Starrett Co. 144, 145
Among tools to be shown are: No. 167 series radius gages; No. 253 dial indicator set; No. 657 magnetic base indicator holder; micrometer for measuring odd flutes; High-speed welded edge hole saws; tool oil and layout die. In all, more than 3000 items will be displayed.
STEEL 132
A Penton publication.
Supreme Products Inc. 242
Swivelier Co, Inc. 351
Universally adjustable lighting products for commercial and industrial use.
Synthane Corp. 142
Laminated thermosetting plastic sheets, tubes, rods and fabricated parts. Machine tool parts including pulleys, handwheels, clutch rings and machine tool ways. Insulating materials for electrical and electronic controls.
Syntron Co. 554
Vibrating parts feeders; electric bin vibrators; vibratory materials handling equipment display; vibrating packer or jogger. Selenium rectifier power conversion unit; hopper level switches; infrared radiant heating panels and heating elements. Flow control valves; mechanical shaft seals.

Tapmatic Corp. 645
Teer, Wickwire Inc. 546
G. H. Tennant Co. 520, 521
Industrial floor machines. Power sweepers, gasoline and LP-Gas units. Portable chipping machines (descalers). Vacuum-sweeping and polishing machines. Floor seals, hardeners, coatings and finishes.
Thomas Publishing Co. 578
Timken Roller Bearing Co. 425, 426
Various Timken tapered roller bearings.
Toledo Scale Co. 524
Torit Mfg. Co. 846
Trabon Engineering Corp. 422
Tumpane Co. Inc. 400
Twin Disc Clutch Co. 103
Models MOS (single) and MOD (duplex) oil-actuated multiple-plate clutches; complete line of friction and fluid drives.

U. S. Electrical Motors Inc. 815, 816
All major models in this line of industrial motors. Varitrol pneumatic control for Varidrive motors.
Union Mfg. Co. 159
United States Rubber Co. 102

Vaivair Corp. 835
Vapor-Blast Mfg. Co. 469
VB Junior Model 1818 liquid honing machine.
Vascoloy-Ramet Corp. 246, 247
Tool holder for throw-away inserts with 6-degree positive rake; complete line of positive and negative rake tool holders, inserts, wire and rod drawing dies, standard tools and blanks, Tantung, investment castings and mining tools.
Veeder-Root Inc. 240
"Countrol" for Production.
Vickers Electric Division, Vickers Inc. 544
Magneclutches and Magnebrakes, magnetic amplifiers, selenium rectifiers, photoelectric cells.
E. F. Viltet Sales Inc. 456
Visual Plant Layouts Inc. 812
Scale operating model of billet chipper; line of three-dimensional models and two-dimensional repro-templets.

Wagner Electric Corp. 129
Open and enclosed, polyphase, squirrel-cage motors. Display panel showing operation of various air and hydraulic brakes, actuators and controls.
Warner Electric Brake & Clutch Co. 152
MDO-30 multiple disc-oil clutch and brake; electric brakes and clutches.
Jervis B. Webb Co. 518
Control unit for power and free conveyor system; package electronic load control unit.

—or, if you prefer, let us tell you the whole story right now—the story of how you can produce more gears and better gears—more splines and better splines—in less time—at lower cost.

Gear-O-Mation* will be shown in operation at the Machine Tool Show. All units are now in production and have been production-tested.

*Trademark

MICHIGAN TOOL Company
from blank to finished gear
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IN CANADA: COLONIAL TOOL CO., LTD.

H & S Herringbone Gears

All H & S Sykes type, continuous tooth herringbone gears are made with extra heavy rims, arms and hubs. This provides reserve strength and dimensional stability. Greater face width, accuracy of generating and dimensional correctness assure increased load carrying capacity.

Made with a 30° helix angle, these gears provide smooth, quiet operation. There is no axial thrust. Several teeth are always in contact.

H & S herringbone gears are available in sizes up to a 60" pitch diameter with a D.P. of 2. They can be furnished in any modern gear material.

Our years of experience engineering and manufacturing all types of gears is available to help you select the best gearing for your application. Just send us the details or call. There is no obligation.

Send note on Company Letterhead for 488 Page Catalog 49.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 Hamilton Avenue

Cleveland 14, Ohio

EXHIBITORS

Westinghouse Air Brake Co. 149
Hydraulic power steering for self-propelled off-highway equipment; pneumatic control systems; dual-acting, in-line desurger; type "D" pilotair valve; pneumatic cylinders.
Westinghouse Electric Corp. 401, 403
West Point Mfg. Co. 286
Wilson Mechanical Instrument Division
American Chain & Cable Co. Inc. 116
Fully automatic Rockwell hardness tester; motorized Rockwell hardness tester; hand-operated Rockwell and superficial Rockwell testers; Tukon microhardness tester; accessories for all models.

COLISEUM MACHINERY SHOW
Chicago Coliseum

American Herforder Corp. 444
American Positive Grip Vise Corp. 419
American Pullmax Co. Inc. 130
Sheet and plate fabricating machines.
Armstrong Bros. Tool Co. 550
Atlantic Instrument Corp. 123
Atlas Press Co.
Clausing Division 515
6300 series Clausing 12-in. lathe; 5300 series Clausing 12-in. lathe. Clausing 18-in. heavy-duty drill press. Clausing vertical mill.
Bansbach Machinery Co. 751
Baird Machine Co. 619
76H six-spindle chucking machine. No. 3-25 automatic multiple transfer press. No. 2 four-slide automatic wire forming machine; No. 00 automatic four-slide wire forming machines. 54VC vertical continuous lathe.
Barer Engineering & Machinery Co. Ltd. .553
Precision toolroom lathes, extra heavy-duty lathes. Milling machines. Shapers. Drill presses. Lathe chucks.
Black Drill Co. 719
Boice-Crane Co. 715
Drill presses and tappers. Band saws, metal and wood-cutting, one and eight-speed models; contour saw-band filer combination; table saws, 10 in. Jointers, 8 x 84 in. File band replacements.
Burg Tool Mfg. Co. Inc. 716
Turret drills: 2A and 2R six-spindle; power indexing automatics; 2BH six-spindle and eight-spindle hydraulic automatics; six-spindel, power indexing radial.

Clinton Machine Co. 516
Commander Mfg. Co. 502
Drilling and tapping equipment: Commander Multi-Tapper; Pneumatic tapper; Commander Multi-Drill; Tapper; Lead-Matic tapper; Select-A-Spindle; Multi-Angle drill unit; Drill chip breaker; Precision drilling coolant table; adjustable depth spindles; fixed position plate.
Crystal Lake Machine Sales Corp. 650
No. 816 universal grinder; No. 612 surface grinder; No. 750 plain grinder.

Dake Engine Co. 105
A. P. deSanno & Son Inc. 311
Diamond Saw Works Inc. 400
DoAll Co. 528
Automatic power saw; model 26-3 contour sawing machine; Zephyr sawing machine. Surface grinders.

East Chicago Machine Tool Corp. 650
Portable, hydraulic scrap metal baler; Cyclomatic Balemaster baling system.
Electro Arc Sales Co. 210
Electro Arc metal disintegrators. Fry multiple-duty lathe tooling. Fry chatter-resistant boring bars. Readepth depth gages.
Elgin Tool Works Inc. 320
Precision hydraulic tracer lathe. Hand screw machine. Horizontal mill.

Fawick Airflex Division
Fawick Corp. 215
Timing Rotorseal air-seal and cycle timer.
Fenn Mfg. Co. 609
78 transfer press with two 7-ton stations. 3F swager with hydraulic feed. Three-way combination, general purpose, laboratory mill. 4 TH Turks Head. 4-in., 5-in. and 7-in. quick acting milling vises.
Fenway Machine Co. Inc. 210
Model "A" nibbler; model "B" nibbler; model "HN" nibbler.
C. Allen Fulmer Co. 615

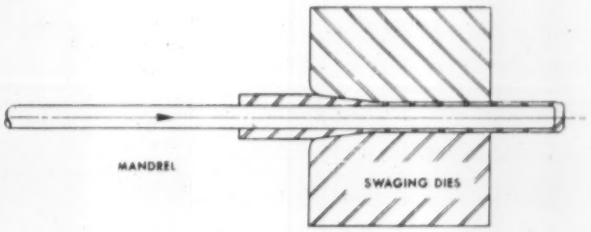
James W. George Machinery Co. 736
Graham Machine Tool Co. 425
Pearson model H, turret-type, vertical milling machine; Shef ram-type milling machines; No. 1G Evans universal milling machine; Graham dial-type, universal milling machines. 10 x 24-in. Astra hydraulic surface grinder.
Grand Specialties Co. 422
Grob Inc. 110
Hammond Machinery Builders Inc. 214
CM6 medium-duty chip breaker grinder; CBW-6 heavy-duty chip breaker grinder.

IGMA Inc. 224
Jiffy Tool Supply Co. Inc. 729
Metal disintegrator machine.
I. O. Johansson Co. 320
Model 8-30 box-column, drilling machine.

Fabricating long, thin-walled cups... by Mandrel Swaging

This extra deep, thin-walled cup would be impossible to make by the usual method of deep drawing in a press. But swaging provides an easy solution to the problem.

A cup is drawn having the same volume of metal in the wall as the desired finished cup.



By swaging the drawn cup over a hardened mandrel, the wall is thinned and the cup lengthened to required proportions.

Look at the possibilities swaging holds for you!

1. **Fast**—can be performed by unskilled workers to produce more pieces at lower cost.

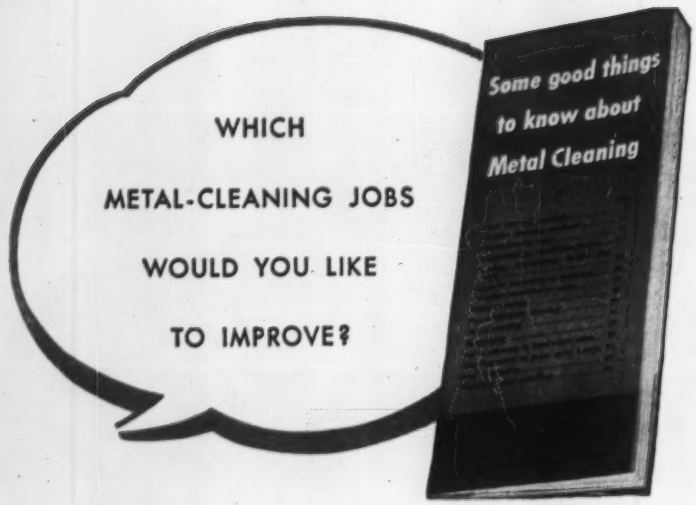
2. **Economical**—saves on skilled labor and material . . . no chips, no waste, no scrap.

3. **Accurate**—hardens metal to give it added strength, better finish and dimensional accuracy.

Write for our informative booklet on swaging. Our detailed descriptions of Torrington Rotary Swagers and their capabilities may start you on the road to your own "Swaging Success Story."

THE TORRINGTON COMPANY
Swaging Machine Division
150 North Street, Torrington, Conn.
Makers of Torrington Needle Bearings

TORRINGTON ROTARY SWAGING MACHINES



Listed below are some of the operations discussed in Oakite's 44-page handsomely illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite methods can give you better production with greater economy.

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SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

OAKITE PRODUCTS, INC.
348 Rector St., New York 6, N. Y.

Tell me about Oakite methods and materials for the following jobs:

- ☐ Tank cleaning
- ☐ Machine cleaning
- ☐ Electrocleaning
- ☐ Pickling, deoxidizing
- ☐ Pre-paint treatment
- ☐ Zinc phosphate coating
- ☐ Paint stripping
- ☐ Steam-detergent cleaning
- ☐ Barrel cleaning
- ☐ Burnishing
- ☐ Rust prevention
- ☐ ALSO send me a FREE copy of your booklet *"Some good things to know about Metal Cleaning".*

At The Production Engineering Show Visit Oakite Booth No: 652

Name _____

Company _____

Address _____

EXHIBITORS

J. M. Kalins & Co. 751
Regent duplicator table.

Kearney & Trecker Corp. 710
Walker-Turner Division

Kling Bros. Engineering Works 453
High-speed friction saws.

Kropp Forge Co. 742
Forged parts for aircraft, machine tools, automotive and other major industries. Scale model of drop forge hammer.

Lake Shore Engineering Co. 421
Dynamometer bases; base plates; surface plates and stands; layout plates; engine jacks and stands.

K. O. Lee Co. 554
B943 motor-driven grinding workhead; BA800 series grinders. Grinding fixtures, expanding mandrels, keyless drill chucks, wheel dressers. Arc welders.

M.B.I. Export & Import Ltd. 754

Machinery Dealers National Association ... 750
Used machine tool clinic.

Man-Au-Cycle Corp. of America 211
Man-Au-Cycle automatic threading lathe.

Manning, Maxwell & Moore Inc. 647
1-ton Load Lifter electric hoist; Budgit aluminum chain blocks; Shaw-Box standard chain blocks; Load Lifter ½-ton electric hoist; Budgit electric hoists with trolleys; Tugit lever-operated hoists.

Maserati Corp. of America 636

Masters' with Arboga 122
Arboga heavy-duty, 2-hp grinder. Arboga vertical mill.

Mead Specialties Co. 207
Automatic air hydraulic drill press feed. Electro-pneumatic timer for automatic air cycles. Adjustable-stroke midget air cylinders. Stock air cylinders valves, air impact hammers, air collet fixtures air presses, air vises, work feeders and pneumatic timers.

Mitts & Merrill Inc. 121

Nicholas Equipment Co. 127
Double header polisher; double roll mirror polisher; universal grinder.

O'Neil-Irwin Mfg. Co. 653
12-ton Di-Acro hydraulically operated press brake; Di-Acro punch presses. Di-Acro Hydra-Power benders. Di-Acro rod parters. Di-Acro notchers.

Pangborn Corp. 117
Pictorial display of blast cleaning and dust collection equipment.

Pioneer Tool Engineering Co. 220

Portage Machine Co. 521
Horizontal boring, drilling, milling and duplicating machine. Portage Double Quick tooling.

Production Machine Co. 622
Centerless grinding machine using abrasive belts as grinding and regulating medium; twin-belt surfacing machine.

Raytheon Mfg. Co. 111

Reeves Pulley Co. 748
Vari-Speed Motodrive, integral and fractional horsepower sizes; Vari-Speed motor pulley; variable speed transmission; Flexi-Speed drive. A-C motors and gear motors.

Geo. T. Schmidt Inc. 641

Sealol Corp. 417
Fluid transfers. Mechanical seals.

Service Machine Co. 126

Sheldon Machine Co. Inc. 702
Complete line of Sheldon lathes, milling machines and shapers; Sebastian 13-in. and 15-in. geared head lathes.

Simplex Machine Tool Corp. 625

Skil Corp. 544
Model 75, ¼-in. heavy-duty drill; Model 852 disc sander; Model 231, 12-gage shear; Model 247 bench grinder; other drivers, drills, sanders, grinders and shears.

Sleeper & Hartley Inc. 617
No. 1 universal spring coiler, segment type, series 666; No. 0 universal spring coiler, escapement type, series 720. No. 1 torsion spring machine, series 614.

Smith & Wiese Co. 107

South Bend Lathe Works 543
Vertical milling machine. 13-in. turret lathe; 16-in. tool room lathe; 10-in. toolroom bench lathe; 9-in. self-contained drive floor lathe with handlever bed turret. 14-in. drill press. 7-in. bench shaper. 10-in. pedestal tool grinder. Red Arrow ground thread collets.

U. S. Burke Machine Tool Division 616
Quartet No. 2 horizontal universal knee-type milling machine; U. S. vertical powerfeed-head milling machine; No. 1 U. S. hand milling machine; No. 4 Burke universal bench milling machine.

Wells Mfg. Corp. 644

K. R. Wilson Inc. 114
50-ton, automatic, four-column, guided-platen hydraulic press; 15-ton hand-air-oil and a 25-ton motor-operated, adjustable bed, hydraulic gap presses; hand and motor-operated general shop presses.

Zagar Tool Inc. 461
Cam drill units; Air-Oil feed drill press. Broaching machines. Gearless multiple-spindle drill heads, collet tools, drill fixtures and special tools.

If these really cost less . . . then why do so many mass-producers keep on using these?

Since American first gave Phillips-head Screws to industry, more and more smart production men have graduated from "price-tag buying" and its false economies.

And once they sell themselves on American Phillips Fastening, *they stay sold.* That's why you see more and more major makers . . . of cars, refrigerators, radios, TVs, in fact the finest consumer hard goods in all lines . . . using *substantially more* American Phillips Screws every year.

If you've ever driven one, you know why! *And if you haven't, why don't you?* Just fit the recessed head on the 4-winged driver . . . aim it . . . pull the trigger . . . and that's all there is to making a flush, tight American Phillips Fastening, *with screwhead and work-surface both unbroken.*

Now, these same production men know they can bank on American for quality as specified, delivery as promised, and service as you can find it nowhere else. And American will give you this same *priceless* sense of security . . . right from the first order you place. *Now?*

✕ *marks the spot. . . the mark of extra quality*

AMERICAN SCREW CO.

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
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one must set the example

. . . and with high speed steel it's REX

It's a real satisfaction when you set the example by what you make . . . when it becomes a *standard for comparison*. That's why Crucible is proud to have kept REX high speed steel tops in its class for so many years.

But don't take our word for REX's superiority. Try it on your own work. Compare its structure, finish, hardenability, carbide distribution and general uniformity. You'll see for yourself why it's the *standard* wherever high speed steels are used.

Remember, REX is made only by Crucible. So call for REX at your nearby Crucible warehouse, or for quick mill delivery — *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

Visit us at Booths 830-832 Production Engineering Show, September 6-16, Navy Pier, Chicago.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Market Outlook

STRUCTURAL sections and plates—two of the steel products in tightest supply—will be even harder to get because of the New England floods.

The New England area will need those forms to replace bridges and other structures destroyed by the raging rivers. The New Haven Railroad, for instance, lost ten bridges, and the Lackawanna Railroad lost a main line bridge. Railroads also lost freight cars and tracks.

Many buildings that will require structurals for replacement were destroyed. Considerable machinery was damaged.

EMERGENCY—Replacement will be made as quickly as possible, and this will require early delivery of steel. The emergency nature of the needs might give them priority over steel on order.

Structural sections and plates were in strong demand because of the high rate of construction. A few weeks ago, railroads moved strongly into the market for new freight cars. These require products of the structural mills and plate mills, particularly the latter. Shipbuilders also have stepped up their demand for plates.

Mills have only a limited amount of steel to allot to structurals and plates, because other products—such as sheets and bars—are in strong demand, too.

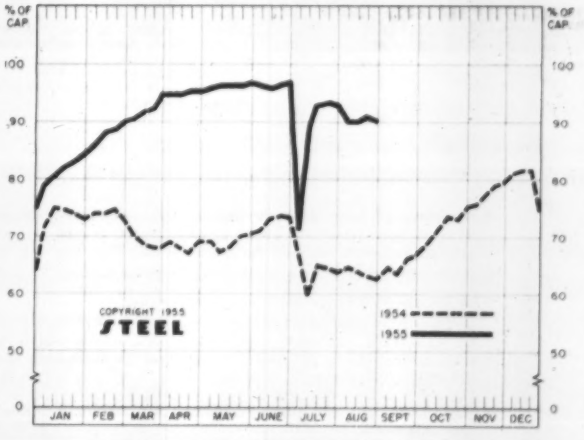
FLOOD CUTS OUTPUT—Not only did the New England flood create a need for more steel, but it reduced steel output in that area at a time mills were striving to catch up with heavy demand. Copper and brass mills in the area, just recovering from the effects of the copper strike, will not be back to normal production for weeks. Damage to electrical machinery was extensive. Some producers are allocating orders to regular customers out of dwindling stocks.

NICKEL TOUGH—Mills are allocating steel to their customers to help everyone get enough steel to keep operating. Producers of nickel alloy steel are having a particularly difficult time. They can't get enough nickel for their needs. When a call comes in for a high nickel alloy steel for nondefense uses, producers see whether the customer could use an alloy using little or no nickel. When the order is for a defense use, producers ask the customer for a certification. The certification can be passed back to the government for nickel to cover the order.

LOSING GROUND—Despite efforts to keep steel production high, the industry lost ground in the week ended Aug. 28. Principally responsible were the New England floods and a wildcat strike at a Detroit mill. From the preceding week's rate, national ingot output slid 1 point to 90 per cent of capacity.

PRICES STEADY—Undertone of the markets is steady. STEEL's arithmetical price composites are unchanged at $127.41 on finished steel, $59.77 on malleable iron, $58.99 on No. 2 foundry iron and $58.49 on basic iron. The scrap price composite holds at a revised figure of $44.33. U. S. Steel Corp. announced an increase of 40 cents per base box on electrolytic and hot-dipped tin plate, black plate and terne plate effective Oct. 1, 1955, through Mar. 31, 1956.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Aug. 28	Change	Same Week 1954	Same Week 1953
Pittsburgh	97.5	+ 3*	64.5	97
Chicago	95.5	— 0.5*	66.5	94.5
Mid-Atlantic	92	— 1.5	61	96
Youngstown	100	0	63	106
Wheeling	96	— 1	70.5	94
Cleveland	98	— 2*	56.5	102
Buffalo	105	0	56	106.5
Birmingham	98	+ 38	62	94
New England	87	0	52	85
Cincinnati	92	— 2.5	52.5	75.5
St. Louis	104	+ 8	46.5	94.5
Detroit	47	— 40.5	62.5	106
Western	101	0	77	102.5
National Rate	90	— 1	62.5	94.5

INGOT PRODUCTION‡

	Week Ended Aug. 28	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	*137.3†	135.5	136.3	94.3
NET TONS (In thousands)	2,206†	2,176	2,190	1,515

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Aug. 23 1955	Aug. 16 1955	Month Ago	July Average
(1947-1949=100)	153.9	153.9	153.9	153.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical Stainless, 304 (100 ft)	180.952
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.533
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.233
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.333
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless, 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale Ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 24 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	207.63	207.63	207.63	194.19	156.99
Index in cents per lb	5.625	5.625	5.625	5.261	4.253

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$127.41	$127.41	$127.41	$117.77	$94.50
No. 2 Fdry. Pig Iron, GT	58.99	58.99	58.99	56.54	46.85
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	45.97
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	47.49
Steelmaking Scrap, GT	44.33	44.33†	42.00	29.00	42.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 24 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.10-4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.46
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.50	4.50	4.50	4.225	3.90
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.50	4.50	4.50	4.225	3.90
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.50
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.317	6.317	6.317	5.75	4.15-4.50
Strip, C.R., Chicago	6.35-6.45	6.35-6.45	6.35-6.45	6.00	4.30
Strip, C.R., Detroit	6.35	6.35	6.35	5.60-5.90	4.35-4.95
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$63.00
Wire rods, 7/32-9/16" Pitts.	5.025	5.025	5.025	4.675	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$48.50
Basic, Valley	58.50	58.50	58.50	56.00	46.00
Basic, deld. Phila.	56.16	56.16	56.16	49.66	50.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	46.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	46.50
No. 2 Fdry, deld. Phila.	59.66	59.66	59.66	50.16	50.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.43	49.08
Malleable, Valley	59.00	59.00	59.00	56.50	46.50
Malleable, Chicago	59.00	59.00	59.00	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.50	$44.50	$42.00	$29.50	$46.00
No. 1 Heavy Melt, E. Pa.	46.50	46.50*	43.00	27.50	41.50
No. 1 Heavy Melt, Chicago	42.00	42.00	41.00	30.00	40.00
No. 1 Heavy Melt, Valley	46.50	46.50	41.50	30.50	46.25
No. 1 Heavy Melt, Cleve.	44.00	44.00	39.50	28.50	43.25
No. 1 Heavy Melt, Buffalo	39.50	39.50	34.50	26.50	39.75
Rails, Rerolling, Chicago	64.50	64.50	59.00	44.50	56.50
No. 1 Cast, Chicago	46.50	46.50	45.50	35.50	49.50

*Revised

COKE, Net Ton

Beehive, Furn. Connlsvl.	$13.625	$13.625	$13.75	$14.75	$14.25
Beehive, Fdry, Connlsvl.	16.50	16.50	16.75	16.75	15.50
Oven, Fdry, Chicago	25.75	25.75	24.50	24.50	21.00

Daily Nonferrous Price Record

	Price Aug. 24	Last Change	Previous Price	July Avg.	June Avg.	Aug. 1954 Avg.
Copper	40.00	Aug. 24, 1955	36.00-40.00	36.000	36.000	30.000
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.846
Zinc	12.50	June 16, 1955	12.00	12.250	12.250	11.000
Tin	96.375	Aug. 24, 1955	96.25	97.045	93.668	93.332
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 1, 1955	23.20	23.200	23.200	22.119
Magnesium	32.50	Aug. 16, 1955	28.50	28.500	28.500	27.000

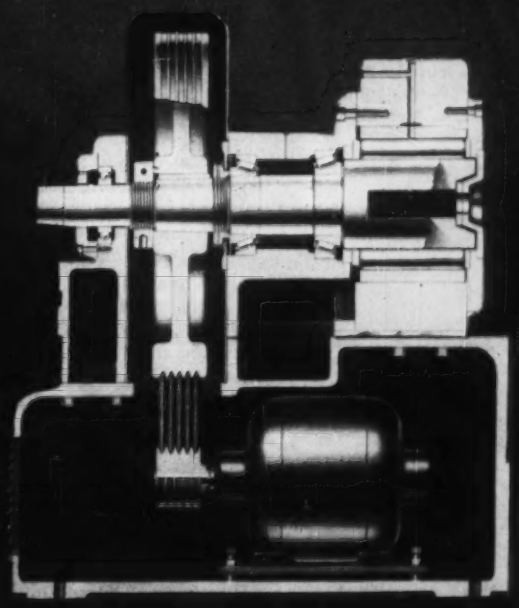
Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

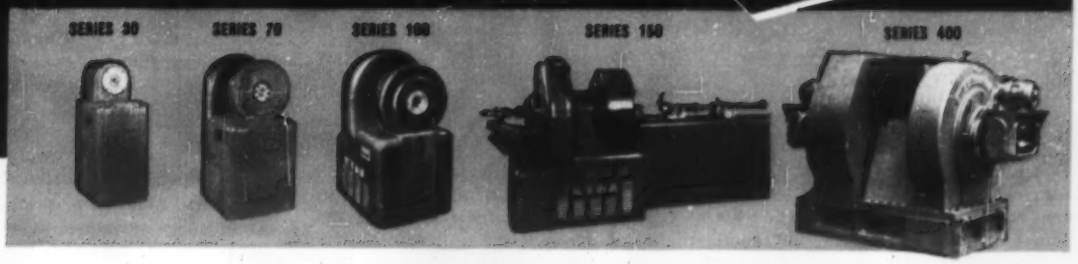
- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

IF IT'S SWAGING... It's Etna...

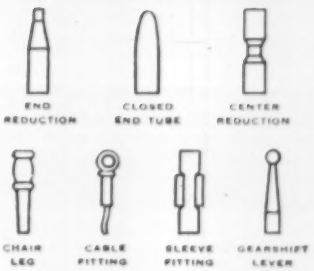
FOR CONTINUOUS PRECISION PRODUCTION!



A COMPLETE RANGE OF SIZES AND CAPACITIES



For tapering, sizing, reducing and forming to special shapes of round solids and steel tubing, the Etna Swaging Machine offers the ultimate in modern machine design. Regardless of size and description of the job to be done, there's an Etna swager right for *greater production*. Write today regarding your specific job problems.



It's New! Get full information on the blending into the wall of I. D. Bead on steel and stainless steel tube with Etna Swagers resulting in mirror finish. Bead also removed on conduit.

Abbey ETNA Company

3402 MAPLEWOOD AVE., TOLEDO 10, OHIO

Nonferrous Metals

Connecticut's brass mills are digging out of the mud, but it will be another four weeks before production returns to normal. Copper price still is feeling upward pressure

Nonferrous Metal Prices, Pages 266 & 267

THE COPPER AND BRASS industry is reeling under one of the most severe blows it has ever taken. A month will pass before some facilities are operating at first-half level.

The flood in Connecticut's Naugatuck valley did damage that even now can only be guessed at in the millions of dollars. The Copper & Brass Warehouse Association estimates that anywhere between 20 and 40 per cent of brass mill production capacity was washed out.

Waterbury Waterlogged—Waterbury, Conn., was probably the hardest hit area from the brass mills' viewpoint. Chase Brass & Copper Co. had 8 ft of water standing in the plant. It will take three to four weeks to rewind the motors and get them operating. American Brass Co.'s three plants were inundated. Scovill Mfg. Co., least affected by the flood, was back in operation last week, but only after removing a large part of its machinery for repairs.

Elsewhere, Seymour Mfg. Co. will be down another week or so, as will Plume & Atwood Mfg. Co. Bristol Brass Co. and Bridgeport Brass Co. were the only brass mills in the valley to remain comparatively unaffected by the water.

Pressure Grows—Some brass mills are allocating warehouse stocks among regular customers, but coming on top of the copper strike, the flood caught those supplies at low ebb. Demand for copper and copper-base products is putting greater pressure than ever before on existing supplies.

In turn, greater pressure is being put on the price of copper, which at 40 cents has set a modern record. Even when this price was set after the copper strike, there was pressure to raise it higher to bring it more in line with the world market. (London metal has sold for more than 47 cents.) Many industry men believe producers are following an unrealistic policy in keeping their prices down.

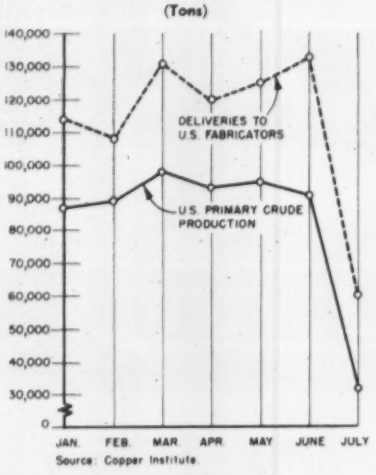
Producers agree that 40 cents is unrealistic, but for another reason. They liked the 30-cent level. They want a cheaper metal to compete with their chief rival, aluminum.

Lose Both Ways—It looks like two courses are open. Producers could give way to the world market and raise prices even more. This might increase imports, especially from Chile, to ease the supply situation a little. But, undoubtedly, some customers would balk at the higher cost rather than absorb it or pass it on to their customers.

Producers could hold the line and sweat it out, which might cause imports to continue their alarming decline and make the domestic supply even tighter. Some copper users that already have had supply troubles for seven or eight months undoubtedly would throw in the towel on copper and try something else. The choice is not an easy one to make, but there are a lot of people betting on 42-cent copper.

COPPER

What a Difference a Strike Makes



Warehouses Feeling Pinch

The Copper & Brass Warehouse Association lost no time in sizing up the situation from the distributors' viewpoint. Herbert Barchoff, president of the group, said a survey of the brass mills indicates that "a large part of the production will be lost for the month of September. Distributor inventories will be drained to the vanishing point in a matter of weeks . . . even after resumption of operations, the flood's effect on brass production will be felt for a minimum of four to six weeks."

Government Reports on Goals

There is still plenty of purchasing to be done before the goals set by the government for certain strategic and critical materials are reached, reports Edmund S. Mansure, administrator of general services. As of June 30, the program stood as follows:

Tungsten: Goal, 3 million short ton units (20 lb each); delivered, 1,930,028 units.

Manganese: Goal, 37 million long ton units (22.4 lb each); delivered, 14,728,575 units.

Chrome: Goal, 200,000 long tons; delivered, 87,833 tons.

Beryl: Goal, 1500 net tons; delivered, 708 tons.

Columbium-Tantalum: Goal 15 million lb; delivered, 11,842,162 lb.

Smelters Ask for Stockpile Ban

The Aluminum Smelters Industry Advisory Committee recommended to Business & Defense Services Administration that the government give up its call for national stockpile aluminum in the fourth quarter. The smelters, who say they have been hurt by the high cost of aluminum scrap, also asked that exports for fourth quarter be restricted to 1500 tons. If any additional metal is needed for export, the committee suggested it come from primary aluminum supplies. The scrap situation has forced secondary aluminum prices several cents above primary prices, which reverses the historical pattern, smelters state.

Market Memos

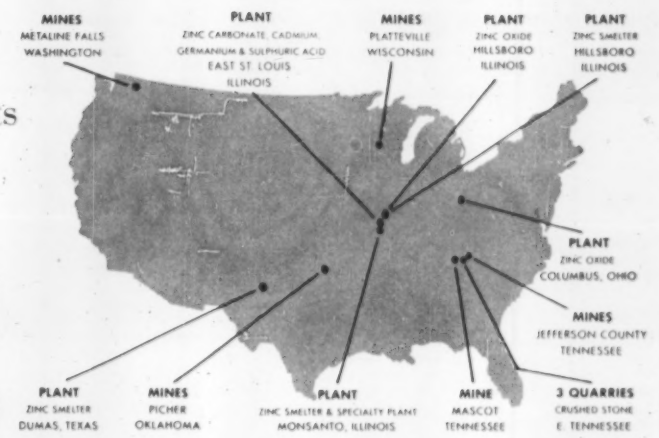
• Aluminum Co. of America announced plans to expand primary aluminum capacity of its Wenatchee, Wash., works to about 100,000 tons annually. Cost will be $2 million. Production from the new equipment should come in about May, 1956.

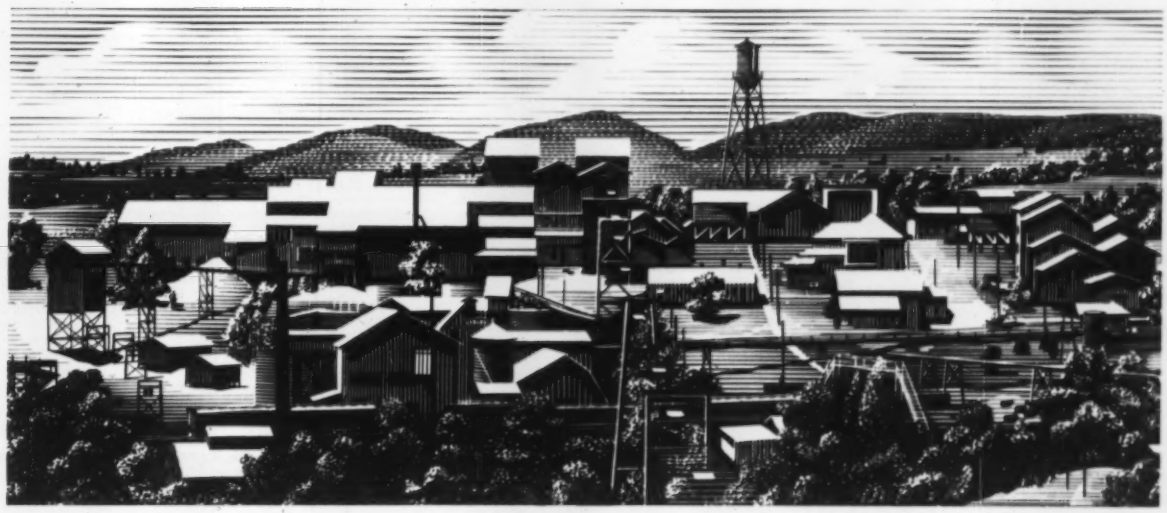
• Shipments of collapsible metal tubes continue to head for a new record as first half figures showed a 3-per-cent gain over the same period last year. Five of the six product classifications showed gains.

• Based on current indications, magnesium castings will show an increase this year over last, according to the Magnesium Association. First half figures show a gain of 12 per cent over first half of 1954.

American Zinc and its products

from A *to* Z





CONCENTRATING MILL,
MASCOT, TENNESSEE

One of the key factors in American Zinc's widespread mining and milling operations. In Tennessee, American Zinc also owns and operates mines in Jefferson County. It is here that one of the largest known reserves of zinc in the United States is found (in excess of 1,250,000 tons of recoverable zinc, proven, with additional large reserves indicated). Other company-owned and operated mining properties are located at Platteville District, Southern Wisconsin; Metaline Falls District, Eastern Washington; and Picher field of the Tri-State Area (Missouri-Kansas-Oklahoma). For the complete picture, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

American Zinc sales Company

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.2; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 27.80; No. 195, 4.5% Cu, 0.8% Si, 27.20; No. 214, 3.8% Mg, 27.7; No. 356, 7% Si, 0.3% Mg, 26.1.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. Valley; 40.00 deld. Midwest; Lake, 36.00 deld.; Fire refined, 39.75 deld.

Germanium: 99.9% $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom, per troy oz.

Lead: Common, 14.80, chemical, 14.90, corroding, 14.90, St. Louis. New York basis, add 0.20.

Lithium: 99% +, cups or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingots; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $253-$255 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $80-$90 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 96.875; prompt, 96.75.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.95, grade A-2 (0.5% Fe max), $3.50 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 12.50; brass special, 12.75; intermediate, 13.00, E. St. Louis, freight allowed over 0.50 per pound. High grade, 13.85; special high grade, 14.00, deld. Diecasting alloy ingot No. 3, 16.50; Nos. 2 and 5, 17.00, deld.

Zirconium: Ingots, commercial grade, 14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.25-32.75; No. 12 foundry alloy (No. 2 grade), 30.00-30.75; 5% silicon alloy, 0.60 Cu max, 31.00-32.25; 13 alloy, 0.60 Cu max, 31.50-32.25; 195 alloy, 31.25-32.25; 108 alloy, 30.00-30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 30.75; grade 2, 29.75; grade 3, 28.75; grade 4, 28.25.

Brass Ingot: Red brass, No. 115, 39.75; tin bronze No. 225, 55.50; No. 245, 47.75; high-leaded tin bronze No. 305, 43.00; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.75.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.74; rod, bar, wire, $1.71.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 41.35-45.35; 30,000-lb lots, 41.48-45.48; l.c.l., 41.98-45.98. Weatherproof, 100,000-lb lots, 40.78-43.78; 30,000-lb lots, 41.03-44.03; l.c.l., 41.53-44.53. Magnetic wire deld., 15,000 lb or more, 48.15-52.36; l.c.l., 48.90-53.11.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $20 per cwt; pipe, full coils, $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.00-20.50; plates, 19.00-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	51.9
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheets and Circles: 110 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate, 66.00c, 30,000 lbs or more, .250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50; Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ⅛-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 18.50-19.50; old sheets, 14.50-17.00; borings and turnings, 10.50-11.50; crankcases, 15.50-17.00; industrial castings, 14.50-17.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.76-58.76b	52.36-56.36c	.....	54.82-58.82	32.000	32.000	31.250
Yellow Brass	46.27-49.27	37.22-40.05d	46.81-49.81	49.18-52.18	23.875	23.625	22.000
Red Brass, 85%	50.99-54.54	50.93-54.48	51.53-55.08	53.80-57.35	28.125	27.875	27.375
Low Brass, 80%	49.75-53.15	49.69-53.09	50.29-53.69	52.56-55.96	27.000	26.750	26.750
Naval Brass	49.99-52.83	44.30-47.14	57.05	53.15-55.99	22.125	21.875	21.375
Com. Bronze, 90%	52.78-56.48	52.72-56.42	53.32-57.02	55.34-59.04	29.250	29.000	28.500
Nickel Silver, 10%	60.20-63.05	62.53g	62.53	.....	27.625	27.375	13.813
Phos. Bronze, A, 5%	73.03-77.14	73.53-77.64	73.53	74.71	32.250	32.000	31.000
Silicon Bronze	62.66-62.82	61.85-62.01	62.70-62.86	64.73e	35.000	34.750	34.000
Manganese Bronze	53.73-56.57	47.80-50.67	58.24	.....	22.125	21.875	21.375
Muntz Metal	48.14-50.94	43.95-46.75	.....	.....	22.375	22.125	21.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. Prices indicate the lowest side of the range. g. Leaded.

Copper and Brass: No. 1 heavy copper and wire, 35.50-36.00; No. 2 heavy copper and wire, 34.50-35.00; light copper, 32.50-33.00; No. 1 composition red brass, 28.50-29.50; No. 1 composition turnings, 27.50-28.50; yellow brass turnings, 18.50-19.00; new brass clippings, 23.50-24.00; light brass, 18.50-19.00; heavy yellow brass, 21.00-21.50; new brass rod ends, 22.00-22.50; auto radiators, unsweated, 22.50-23.00; cocks and faucets, 23.50-24.00; brass pipe, 24.00-24.50.

Lead: Heavy, 11.50-12.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.25; electrotype, 12.00-12.50; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 38.50-42.00; old sheets, 34.00-36.00; turnings, 29.50; rods, 38.50-42.00.

Nickel: Sheets and clips, 80.00-90.00; rolled anodes, 80.00-90.00; turnings, 65.00-75.00; rod ends, 80.00-90.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 5.00-5.50; old die-cast scrap, 3.50-3.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 22.00-22.50; 3003 clippings, 21.75-22.50; 6151 clippings, 21.50-22.50; 5052 clippings, 21.50-22.50; 2014 clippings, 21.00; 2017 clippings, 21.00; 2024 clippings, 21.00; mixed clippings, 21.00-21.50; old sheet, 18.50-19.00; old cast, 18.50-19.00; clean old cable (free of steel), 21.50-22.50; borings and turnings, 18.50-20.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 39.00.

Copper and Brass: No. 1 copper, 39.50-40.50; No. 2 copper, 38.00-39.00; light copper, 36.00-37.00; refinery brass (60% copper) per dry copper content, 35.00-36.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 copper, 39.50-40.00; No. 2 copper, 38.00; light copper, 36.00; No. 1 composition borings, 31.50-32.00; No. 1 composition solids, 32.00-32.50; heavy yellow brass solids, 23.00-23.50; yellow brass turnings, 22.00-23.00; radiators, 25.00-26.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 55.42-56.42, oval, 54.92, 5000-10,000 lb; electrodeposited, 49.78, 2000-5000 lb lots; cast, 55.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.145; 200-499 lb, $1.13; 500-999 lb, $1.125; 1000 lb or more, $1.12.

Zinc: Bar, 21.00; bar or flat top, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 76.80; 200 lb, 76.05; 300 lb, 75.80; 400-900 lb, 75.05; 1000 lb and over, 73.05; effective Mar. 24, 1955.

Copper Sulphate: Crystal, 100 lb, 21.50; 200 lb, 18.50; 300 lb, 17.50; 400 lb, 17.00; 500-1900 lb, 15.50; 2000-10,000 lb, 15.25; 10,000 lb and up, 15.15. Powder, add 0.5 to above prices. Effective Mar. 29, 1955.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 83.125; 16-oz bottle, 81.875; 80-oz bottle, 79.375; 100-oz bottle, 79.375; f.o.b. St. Louis, New York and Los Angeles. Effective Apr. 6, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 72.50; 100-600 lb, 58.10; 700-1900 lb, 55.70; 2000-9900 lb, 53.90; 10,000 lb or more, 52.80.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.588; 50 lb, $1.248; 100-300 lb, $1.098; 400-900 lb, $1.074; 1000-1900 lb, $1.049; 2000-4900 lb, $1.013; 5000-19,900 lb, 95.20; 20,000 lb or more, 89.10.

Stannous Sulphate: Less than 50 lb, $1.287; 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or more, 94.70.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

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From standard spot welders to special machines FEDERAL has the resistance welder tailored to cut your production costs.
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THE FEDERAL MACHINE & WELDER COMPANY
WARREN, OHIO

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 269. Key to footnotes, page 271.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $65.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston 85 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

BILLETS, BLOOMS & SLABS

Carbon, rerolling (NT)

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 .. 73.50
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 76.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 .. 68.50
LoneStar,Tex. L6 ..... 70.00
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
E.Chicago,Ill. R2, U5 .. 68.50
S.Duquesne,Pa. U5 .. 68.50
Youngstown R2 ..... 68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 89.50
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 .. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 92.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston 85 ..... 89.50
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2 .. 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
S.Chicago R2,U5,W14 .. 84.50
S.Duquesne,Pa. U5 .... 84.50
S.SanFrancisco B3 .... 94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 .. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 .... 115.00
Gary,Ind. U5 ..... 96.00
Houston 85 ..... 101.00
Ind.Harbor,Ind. Y1 ... 96.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
S.Chicago R2,U5,W14 .. 96.00
S.Duquesne,Pa. U5 .... 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
S.Chicago R2, W14 .... 103.50
S.Duquesne,Pa. U5 ... 103.50

SKELP

Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.30
Munhall,Pa. U5 ..... 4.225
SparrowsPoint,Md. B2 .. 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 ... 4.225

WIRE RODS

AlabamaCity,Ala. R2 .. 5.025
Aliquippa,Pa. J5 ..... 5.025
Alton,Ill. L1 ..... 5.20
Buffalo B11, W12 ..... 5.025
Cleveland A7 ..... 5.025
Donora,Pa. A7 ..... 5.025
Fairfield,Ala. T2 ..... 5.025
Houston 85 ..... 5.275
IndianaHarbor,Ind. Y1 . 5.025
Johnstown,Pa. B2 ..... 5.025
Joliet,Ill. A7 ..... 5.025
KansasCity,Mo. 85 .... 5.275
Kokomo,Ind. C16 ..... 5.125
LosAngeles B3 ..... 5.325
Minnequa,Colo. C10 .... 5.275
Monessen,Pa. P7 ..... 5.025
N.Tonawanda,N.Y. B11 . 5.025
Pittsburg,Calif. C11 ... 5.675
Portsmouth P12 ..... 5.025
Roebling,N.J. R5 ..... 5.125
S.Chicago,Ill. R2 ..... 5.025
SparrowsPoint,Md. B2.. 5.125
Sterling,Ill.(1) N15 .... 5.025
Sterling,Ill. N15 ..... 5.125
Struthers,O. Y1 ..... 5.025
Worcester,Mass. A7 ... 5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 4.60
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.25
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston 85 ..... 4.70
Ind.Harbor,Ind. I-2 .... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. 85 .... 4.70
Lackawanna,N.Y. B2 ... 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 .... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 4.90
Portland,Oreg. O4 ..... 5.35
Phoenixville,Pa. P4 .... 5.15
Seattle B3 ..... 5.35
S.Chicago U5, W14 ..... 4.60
S.SanFrancisco B3 ..... 5.25
Torrance,Calif. C11 .... 5.30
Weirton,W.Va. W6 ..... 4.60

Wide Flange

Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.40
Lackawanna,N.Y. B2 ... 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 .... 5.15
S.Chicago,Ill. U5 ..... 4.60

Alloy Std. Shapes

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 .... 7.30
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.75
Munhall,Pa. U5 ..... 5.65
S.Chicago,Ill. U5 ..... 5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston 85 ..... 6.85
Ind.Harbor,Ind. I-2, Y1. 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 .... 6.85
Lackawanna,N.Y B2 ... 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
S.Chicago,Ill. U5, W14 .. 6.75
S.SanFrancisco B3 .... 7.40
Struthers,O. Y1 ..... 6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 ... 6.80
Munhall,Pa. U5 ..... 6.75
S.Chicago,Ill. U5 ..... 6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 ... 4.65
Munhall,Pa. U5 ..... 4.60
S.Chicago,Ill. U5 ..... 4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .... 5.45
Lackawanna,N.Y. B2 ... 5.45
Munhall,Pa. U5 ..... 5.45
S.Chicago,Ill. U5 ..... 5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 .... 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 ..... 4.50
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 .... 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 .. 5.15
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 ..... 4.70
Harrisburg,Pa. C5 ..... 5.10
Houston 85 ..... 4.60
Ind.Harbor,Ind. I-2, Y1. 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B2 .... 4.50
LoneStar,Tex. L6 ..... 4.55
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 .... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.50
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
S.Chicago R2, U5, W14 .. 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 .... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 ..... 4.50
Youngstown R2, U5, Y1. 4.50

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ..... 6.30
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 10.40

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Coatesville,Pa. L7 .... 6.725
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1.. 7.375
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston 85 ..... 6.825
Ind.Harbor,Ind. I-2, Y1. 6.725
Johnstown,Pa. B2 ..... 6.725
LosAngeles B3 ..... 7.625
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
S.Chicago,Ill. U5, W14 .. 6.725
SparrowsPoint,Md. B2.. 6.725
Youngstown U5, Y1 .... 6.725

PLATES, Alloy

Bridgeport,Conn. N19 ... 6.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 6.95
Gary,Ind. U5 ..... 6.30
Houston 85 ..... 6.40
Ind.Harbor,Ind. Y1 .... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
S.Chicago,Ill. U5, W14 .. 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

FLOOR PLATES

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. C5 .... 5.575
Ind.Harbor,Ind. I-2 .... 5.575
Munhall,Pa. U5 ..... 5.575
S.Chicago,Ill. U5 ..... 5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10 .. 4.75
Ashland l.c.l. (15) A10 .. 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ..... 4.65
Aliquippa,Pa. J5 ..... 4.65
Alton,Ill. L1 ..... 4.85
Ashland,Ky. A11 ..... 4.85
Bessemer,Ala. T2 ..... 4.65
Birmingham C15 ..... 4.65
Bridgeport,Conn. N19 .. 4.80
Buffalo R2 ..... 4.65
Canton,O. R2 ..... 4.75
Clairton,Pa. U5 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
Fairless Hills,Pa. U5 .. 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind. U5 ..... 4.65
Houston 85 ..... 4.90
Ind.Harbor,Ind. I-2, Y1. 4.65
Johnstown Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. 85 .... 4.90
Lackawanna,N.Y. B2 .... 4.65
LosAngeles B3 ..... 5.35
Massillon,O. R2 ..... 4.75
Midland,Pa. C18 ..... 4.65
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.00
N.Tonawanda,N.Y. B11.. 4.65
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland Oreg. O4 ..... 5.40
Seattle B3, N14 ..... 5.40
S.Chicago R2, U5, W14.. 4.65
S.Duquesne,Pa. U5 .... 4.65
S.SanFran.,Calif. B3 ... 5.40
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers, O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Warren,O. R2 ..... 4.65
Weirton,W.Va. W6 ..... 4.65
Youngstown R2, U5 .... 4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 5.575
Bridgeport,Conn. N19 .. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 ..... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fontana,Calif. K1 ..... 6.625
FairlessHills,Pa. U5 .. 5.725
Gary,Ind. U5 ..... 5.575
Houston 85 ..... 5.825
Ind.Harbor,Ind. I-2, Y1. 5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. 85 .... 5.825
Lackawanna,N.Y. B2 .. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
S.Chicago R2, U5, W14.. 5.575
S.Duquesne,Pa. U5 .... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.80
Houston 85 ..... 7.05
Ind.Harb.,Ind. I-2, Y1 .. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 .... 7.05
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
S.Chicago W14 ..... 6.80
S.Duquesne,Pa. U5 .... 6.80
S.SanFrancisco B3 .... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ..... 4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 4.85
Fontana,Calif. K1 ..... 5.35
Niles,Calif. P1 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SanFrancisco S7 ..... 5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.65
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.90
KansasCity,Mo. 85 ..... 5.90
Youngstown U5 ..... 5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 .... 8.325
Camden,N.J. P13 ..... 8.50
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
SpringCity,Pa. K3 ..... 8.50
Warren,O. C17 ..... 8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 5.90
BeaverFalls,Pa. M12,R2 . 5.90
Buffalo B5 ..... 5.95
Camden,N.J. P13 ..... 6.35
Carnegie,Pa. C12 ..... 5.90
Chicago W18 ..... 5.90
Cleveland A7, C20 ..... 5.90
Detroit R7 ..... 5.90
Detroit B5, P17 ..... 6.10
Donora,Pa. A7 ..... 5.90
Elyria,O. W8 ..... 5.90
FranklinPark,Ill. N5 .. 5.90
Gary,Ind. R2 ..... 5.90
GreenBay,Wis. F7 ..... 5.90
Hammond Ind. L2, M13 . 5.90
Hartford Conn. R2 ..... 6.40
Harvey,Ill. B5 ..... 5.90
LosAngeles R2, S30 .... 7.35
Mansfield,Mass. B5 .... 6.45
Massillon O. R2, R8 .... 5.90
Midland,Pa. C18 ..... 5.90
Monaca,Pa. S17 ..... 5.90
Newark,N.J. W18 ..... 6.35
NewCastle,Pa.(17) B4 .. 5.90
Pittsburgh J5 ..... 5.90
Plymouth,Mich. P5 ..... 6.15
Putnam,Conn. W18 ..... 6.45
Readville,Mass. C14 .... 6.45
S.Chicago,Ill. W14 ..... 5.90
SpringCity,Pa. K3 ..... 6.35
Struthers,O. Y1 ..... 5.90
Waukegan,Ill. A7 ..... 5.90
Worcester,Mass. W19 ... 6.35
Youngstown F3, Y1 .... 5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19 ... 5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 ..... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2, M13 . 7.425
Hartford,Conn. R2 ..... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 .... 7.725
Massillon,O. R2, R8 .... 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 .... 7.625
S.Chicago W14 ..... 7.425
SpringCity,Pa. K3 ..... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 .... 7.725
Youngstown F3, Y1 .... 7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 4.85
Birmingham C15 ..... 4.65
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 .... 4.80
Fontana,Calif. K1 ..... 5.35
Ft. Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston 85 ..... 4.90

Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 .....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1.4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....5.90
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ¼-1" B2 ..6.15
Williamsport,Pa. S19 ..6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.55
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..4.95
Franklin,Pa.(3) F5 ....4.55
Franklin,Pa.(4) F5 ....4.65
Marion,O.(3) P11 .....4.50
Moline,Ill.(3) R2 .....4.65
Tonawanda(3) B12 ....4.50
Tonawanda(4) B12 ....4.65
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt) B14 14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5....16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ...4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 ....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 .....5.075
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1.4.325
Kokomo,Ind. C16 .....4.425
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6, (37)..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. N12 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.325
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2 .4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Kokomo,Ind. C16 ....5.475
Niles,O. N12 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ....6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 ....7.125
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 ....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Cleveland R2 .....4.925
Ind.Harbor,Ind. I-2 ...4.575
Warren,O. R2 .....4.925

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
FairlessHills,Pa. U5 ...5.375
Follansbee,W.Va. F4 ...5.325
Fontana,Calif. K1 ....6.425
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ...6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
FairlessHills,Pa. U5 ..7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ...7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.50	7.10
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....5.90
MartinsFry.O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Delphos,O. N16 .....6.60‡
Dover,O. R1 .....5.85‡
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Niles,O. N12 .....6.85‡
Pittsburg,Calif. C11 ...6.60*
SparrowsPt.,Md. B2 ...5.85‡
Steubenville,O. W10 ...5.85‡
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ....5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.575

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25
Niles,O. N12 .....7.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ...5.90
Middletown,O. A10 ....5.90
Niles,O. N12 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 .....6.25
Niles,O. N12 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.325
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackawanna,N.Y.(25) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
NewBritain(10) S15	4.325
N.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	5.075
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. C5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.525
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575
Warren,O. R2	4.925

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland J5	6.45
Cleveland A7	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.45
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.50
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	7.00
NewHaven,Conn. D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.45
Portsmouth,O. P12	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	7.10
Youngstown Y1	6.45
Youngstown C8	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	...
Carnegie,Pa. S18	...	8.95	10.50	12.65	...
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	...	...
Detroit D2	7.10	9.05	10.60	12.75	...
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. F4	7.40	8.95	10.50**	...	...
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	...
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	...
NewKensington,Pa. A6	7.00	8.95	10.50	...	...
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C. max.

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.40	17.60	...
Buffalo W12	...	...	14.40	...	...
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	...	...
Youngstown C8	...	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	...
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	...
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	...
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	...	...	...
Newport,Ky. N9	12.80	...	...	...
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80§	13.35§	13.85§	14.85§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	...	15.85	17.45	17.95	13.55§
Butler,Pa. A10	...	...	17.45	17.95	...
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	...	...	...	...	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils annealed, semiprocessed ½c lower. §Coils, ⅝-cent higher.

Ind.Harbor,Ind. Y1	9.30
Lackawanna,N.Y. B2	9.125
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.125
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.55*
Youngstown C8	6.25*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	7.10*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.60
Dravosburg,Pa. U5	6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Dravosburg,Pa. U5	7.50	7.75	8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175		
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Dravosburg,Pa. U5	8.80	9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Pitts.Calif. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$7.85
Gary,Ind. U5	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.25
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.425
Atlanta A11	6.45
Bartonville,Ill. K4	6.35
Buffalo W12	6.25
Chicago W13	6.25
Cleveland A7	6.25
Crawfordsville,Ind. M8	6.35
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fairfield,Ala. T2	6.25
Fostoria,O.(24) S1	6.45
Houston S5	6.50
Jacksonville,Fla. M8	6.77
Johnstown,Pa. B2	6.25
Joliet,Ill. A7	6.25
KansasCity,Mo. S5	6.50
Kokomo,Ind. C16	6.35
LosAngeles B3	7.20
Minnequa,Colo. C10	6.50
Monessen,Pa. P7	6.25
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.25
Rankin,Pa. A7	6.25
S.Chicago,Ill. R2	6.25
S.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Sterling,Ill.(1) N15	6.25
Sterling,Ill. N15	6.35
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt., Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
WorcesterA7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.50
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8"Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	13.08
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.50
Monessen,Pa. P16	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.55
Roebling,N.J. R5	12.55
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. T6	12.55
Worcester,Mass. A7	12.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	9.75
Fostoria,O.(23) S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	....14.15
Monessen,Pa. P16	....14.20
Roebling,N.J. R5	....14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....9.00
Baltimore T6	.....9.30
Buffalo W12	.....9.00
Cleveland A7	.....9.00
Crawfordsville,Ind. M8	.9.00
Dover,O. G6	.....9.00
Fostoria,O. S1	.....9.00
FranklinPark,Ill. T6	....9.10
Kokomo,Ind. C16	.....9.00
Massillon,O. R8	.....9.00
Milwaukee C23	.....9.20
Monessen,Pa. P16	.....9.00
Pawtucket,R.I. N8	....9.30
Riverdale,Ill A1	.....9.10
Rome,N.Y. R6	.....9.00
Trenton,N.J. R5	.....9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester, Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	..$9.05
Wheeling,W.Va. W10	...9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	..$9.35
Bartonville,Ill. K4	....9.45
Buffalo W12	.....9.35
Crawfordsville,Ind. M8	..9.46
Donora,Pa. A7	.....9.35
Duluth,Minn. A7	.....9.35
Johnstown,Pa. B2	.....9.35
Joliet,Ill. A7	.....9.35
Kokomo,Ind. C16	.....9.45
LosAngeles B3	.....10.14
Minnequa,Colo. C10	....9.60
S.Chicago,Ill. R2	.....9.35
SparrowsPt.,Md. B2	...9.45
Sterling, Ill. N15	.....9.35
Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	..$9.65
Bartonville,Ill. K4	.....9.75
Buffalo W12	.....9.60
Crawfordsville,Ind. M8	..9.75
Donora,Pa. A7	.....9.65
Duluth,Minn. A7	.....9.65
Johntown,Pa. B3	.....9.65
Joliet,Ill. A7	.....9.65
Kokomo,Ind. C16	.....9.75
LosAngeles B3	.....10.45
Minnequa,Colo. C10	....9.90
S.Chicago,Ill. R2	.....9.65
SparrowsPt.,Md. B2	....9.75
Sterling,Ill. N15	.....9.65
Coil No. 6500 Interim	
AlabamaCity,Ala. R2	..$9.70
Bartonville,Ill. K4	....9.80
Buffalo W12	.....9.70
Crawfordsville,Ind. M8	..9.80
Donora,Pa. A7	.....9.70
Duluth,Minn. A7	.....9.70
Johnstown,Pa. B2	.....9.70
Joliet,Ill. A7	.....9.70
Kokomo,Ind. C16	.....9.80
LosAngeles B3	.....11.05
Minnequa,Colo. C10	....9.95
S.Chicago,Ill. R2	.....9.70
SparrowsPt.,Md. B2	...9.80
Sterling,Ill. N15	.....9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	..175**
Aliquippa J5	.....172§
Atlanta A11	181
Bartonville,Ill K4	181
Crawfordsville,Ind. M8	..181
Donora,Pa. A7	.....175†
Duluth,Minn. A7	.....175†
Fairfield,Ala. T2	.....175†
Houston,Tex. S5	.....180†
Johnstown,Pa. B2	....179*
Joliet,Ill. A7	.....175†
KansasCity,Mo. S5	....180†
Kokomo,Ind. C16	.....177†
Minnequa,Colo. C10	...180**
Monessen,Pa. P7	.....179*
Pittsburg,Calif. C11	...195†
Rankin,Pa. A7	.....175†
S.Chicago,Ill. R2	....175**
S.SanFrancisco C10	...195**
SparrowsPoint,Md. B2	..181*
Sterling,Ill.(1) N15	....179*

WOVEN Fence, 9-15 Ga.

	Col.
Ala.City,Ala. R2	....162**
Ala.City, 17 ga. R2	..241**
Ala.City, 18 ga. R2	..251**
Aliq'ppa,Pa.9-14½ga. J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	..168
Donora,Pa. A7	.....162†
Duluth,Minn. A7	.....162†
Fairfield,Ala. T2	.....162†
Houston,Tex. S5	.....167†
Johnstown,Pa.(43) B2	..166
Joliet,Ill. A7	.....162†
KansasCity,Mo. S5	....167†
Kokomo,Ind. C16	.....164†
Minnequa,Colo. C10	....167**
Monessen,Pa. 9 ga.	P17.166*
Pittsburg,Calif. C11	...185†
Rankin,Pa. A7	.....162†
S.Chicago,Ill. R2	....162**
Sterling,Ill.(1) N15	....166*

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.60	16.50
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Crawf'dsville M8	14.60	16.50
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.40
Waukegan A7	14.50	16.05†
Worcester A7	14.80	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.50	8.075
Bartonville(48) K4	7.50	8.075
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	....
Crawfordsville M8	7.50	8.075
Donora,Pa. A7	7.40	7.80†
Duluth,Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston,Tex. S5	7.65	8.05†
Jacks'ville,Fla.M8	7.90	8.475
Johnstown B2(48)	7.40	7.975*
Joliet,Ill. A7	7.40	7.80†
KansasCity,Mo. S5	7.65	8.05†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7 (48)	7.40	7.975*
Palmer,Mass. W12	7.70	8.10†
Pitts.,Calif C11	8.35	8.75†
Portsmouth,O. P12	7.40	....
Rankin A7	7.40	7.80†
S.Chicago R2	7.40	7.80**
S.SanFran. C10	8.35	8.75**
Spar'wsPt.B2(48)	7.50	8.075*
Str'ling(1)(48)	N15 7.40	7.975*
Struthers,O.(48)	Y1 7.40	7.90†
Worcester,Mass.	A7 7.70	....

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras.

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	..157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	..157
Johnstown,Pa. B2	160
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
So.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	*....157*
Williamsport,Pa. S10	*....160*

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, less case lots, per cent off list, f.o.b. midwestern plants)

4" and shorter:	
½" & smaller diam.	+5
Over 4" through 6":	
½" and smaller diam.	+12
6" and shorter:	
⅞" and ⅝"	+13
¾" and larger	+16
Longer than 6":	
All diameters	+25
Lag bolts, all diams:	
6" and shorter	+2
Over 6" long	+11
Ribbed Necked Carriage	+13
Blank	2
Plow	18
Step, Elevator, Tap and Sleigh Shoe	2
Tire Bolts	12
Boiler & Fitting-Up Bolts	14

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	51
H.P., Hex. regular & heavy	
¾" and smaller	55
⅞" to 1⅛", inclusive	55
1¼" to 1½", inclusive	57
1⅝" and larger	51
C.P. Hex regular & heavy:	
¾" and smaller	55
Larger than ¾"	51
Hot Galv. Nuts (all types):	
¾" or smaller	38
⅞" to 1⅛", inclusive	36
Finished Hex Nuts:	
¾" and smaller	55
⅞" and larger	51
Semifinished & Slotted Hex:	
Regular and heavy, ¾" and smaller	55
⅞" and larger	51

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages; plain finish)

3" and shorter:	
⅛" thru ¼" diam, 25,000 to 200,000 pieces	61
Over 200,000 pieces	64
5/16" thru ½" dia: 15,000 to 100,000 pieces	61
100,000 or more	64
Longer than 3", any diam: 5000 to 100,000 pieces	61
Over 100,000 pieces	64

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1" diam x 6" and shorter	19
1" and smaller diam x over 6"	List

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6" or shorter:	
¼" through ½"	34
7/16" & ⅝" & shorter	31
¾", ⅞" through 1 in.	8

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.41
1¼	13	....	24.94	20.44
1½	13	23.31	27.57	22.60
1⅝	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.59
2¾	12	41.57	49.16	40.31
3	12	45.00	53.22	43.65
3¼	12	47.99	56.76	46.54

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	...	5.65
Fairfield,Ala. T2	...	...	...	5.65
Gary,Ind. U5	4.725	...	...	...
Huntington,W.Va. W7	...	...	...	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	...	...	...	(16)5.65
Lackawanna,N.Y. B2	4.725	4.625	...	5.65
Minnequa,Colo. C10	4.725	4.625	...	6.15
Steelton,Pa. B2	4.725	4.625	...	...
Williamsport,Pa. S19	...	...	...	5.65

TIE PLATES

Fairfield,Ala. T2	....5.625
Gary,Ind. U5	.....5.625
Ind.Harbor,Ind. I-2	..5.625
Lackawanna,N.Y. B2	..5.625
Minnequa,Colo. C10	..5.625
Seattle B3	.....5.775
Steelton,Pa. B2	.....5.625
Torrance,Calif. C11	..5.775

TRACK BOLTS (20) Treated

Cleveland R2	.....12.40
KansasCity,Mo. S5	*12.40*
Lebanon,Pa. B2	.....12.40
Minnequa,Colo. C10	...12.40
Pittsburgh O3, P14	...12.40
Seattle B3	.....12.90

AXLES

Ind.Harbor,Ind. S13	....7.25
Johnstown,Pa. B2	.....7.25

JOINT BARS

Bessemer,Pa. U5	.....5.825
Fairfield,Ala. T2	.....5.825
Ind.Harbor,Ind. I-2	..5.825
Joliet,Ill. U5	.....5.825
Lackawanna,N.Y. B2	..5.825
Minnequa,Colo. C10	...5.825
Steelton,Pa. B2	.....5.825

SCREW SPIKES

Cleveland R2	.....11.90
Pittsburgh O3	.....11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	....7.90
Lebanon,Pa. B2	.....7.90
Minnequa,Colo. C10	....7.90
Pittsburgh J5	.....7.90
Seattle B3	.....8.40
S.Chicago,Ill. R2	.....7.90
Struthers,O. Y1	.....7.90
Youngstown R2	.....7.90

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron: 98+% Fe, annealed	Cents 15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.i.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	21.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb drums, frght. allowed	
Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.00-49.00†
Bronze, 5000-lb lots	58.00-61.50†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	53.25-60.00†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	$1.25
Tin	14.50*
Zinc, 5000-lb lots	18.25-32.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh	4.30-4.40
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.15c
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝ in.: 6.90c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld to mill zone or within switching limits, 5.30c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00†	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Chicago R2	58.50	....	59.00	....
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich., deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. C31	54.50	55.00	55.50	....
Philadelphia, deld.	56.16	56.66	57.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	60.66	60.66	61.16
Verona, Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Low phos, southern grade.
†Phos., 0.30 max.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$80.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	87.50
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	90.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035 max.)	$72.50
Steelton,Pa. B2 (Phos. 0.035 max.)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035 max.)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Duluth I-3 (Intermediate) Phos. 0.036-0.075 max.)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50

Warehouse Steel Products

Representative prices, cents per pound subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Buffalo, Cleveland, Erie, 30 cents; Chicago, Milwaukee, St. Louis, St. Paul, Detroit, Cincinnati, Pittsburgh, 25 cents; Philadelphia, New York, Baltimore, Boston, San Francisco, Los Angeles, and Portland, Oreg., 10 cents; Atlanta, Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	9.10	....	7.65	...	7.61	8.62[5]	13.44	7.93	7.21	8.87
Birmingham	6.70	7.80	8.85	....	6.95	...	7.00	9.35	....	7.20	7.05	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.80	7.93	8.50	46.55	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	7.92	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	7.93	8.85	....	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.12	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Los Angeles	8.05	10.60	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.02	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.28	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	....
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	7.93	9.20	45.67	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	11.80	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.22	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[5]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00[7]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

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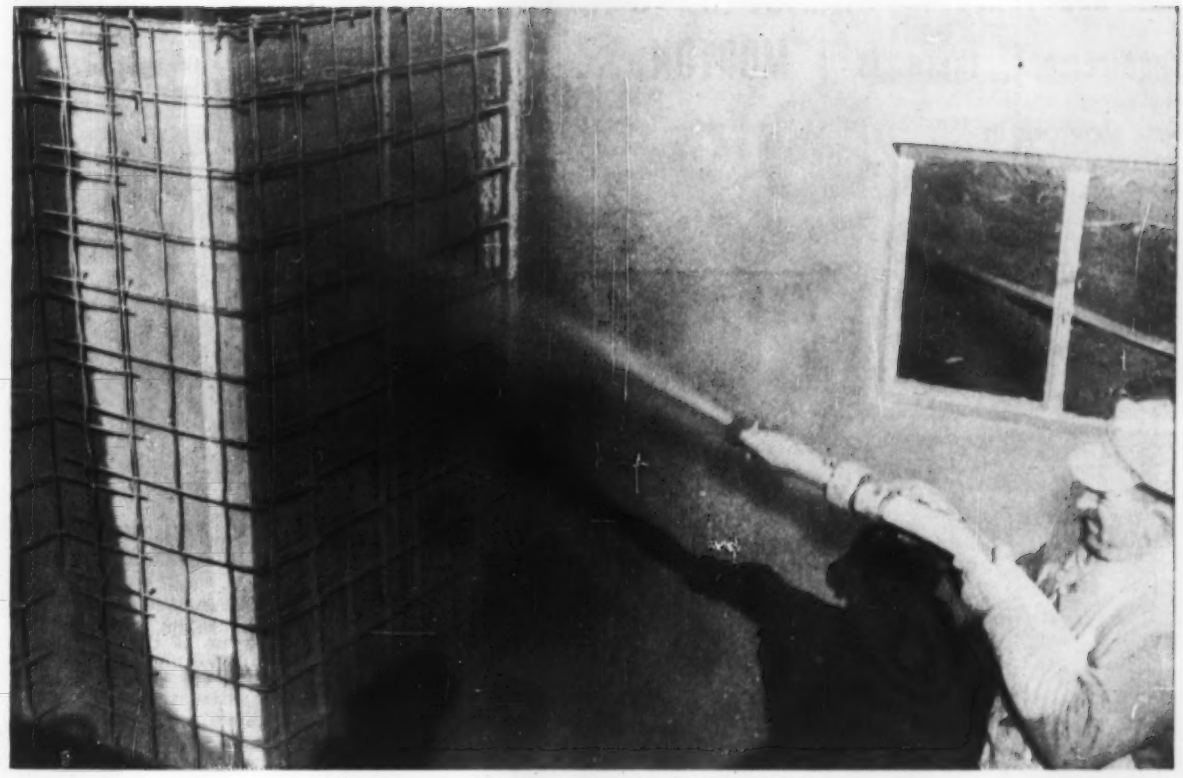
UNITED STATES STEEL



Steel welded wire fabric is used in the interior and exterior walls of this home near Washington. When dry, the reinforced concrete will develop a strength of 6000 psi

Steel Fabric Makers Eye New Market

WELDED WIRE FABRIC manufacturers are watching a new housing development in Dranesville, Va. They hope it will open up a new outlet for concrete reinforcing products.

Merle H. Gillespie Jr., a Virginia builder, is using wire fabric to erect over 220 reinforced concrete homes southwest of Washington. A typical plan, built on a 24 x 44-ft concrete base, calls for about 1900 lb of steel fabric in interior and exterior walls and the floor slab. The house sells for about $2000 to $3000 less in that area than one of similar dimensions made by conventional construction methods. The saving comes in the reinforced walls.

Four Steps—There are four basic components in Gillespie's system, all of them employing metalworking products. First is the erection of exterior concrete walls without forms. Wire fabric (he uses 4 x 4 in. mesh, 6 x 6 gage wire, called 4466) is backed up by ¾-in. insulation board which is held in place by a top plate and the foundation. A plastic but dry concrete mix is shot-creted over this to a depth of 4 in. Temporary wood jigs which back up the insulation board are removed and the interior of the wall is lined with aluminum foil. Then 6666 wire fabric is positioned with the aid of ⅜-in. round dowels projecting through the top plate, and concrete is shot over that area to a depth of 2½-in.

The second component in the system is the gun used to apply the cement. Mr. Gillespie's patented machine, which can be built and sold for about $1000, compared with $7000 for a conventional shot-crete machine, uses a 1-hp electric motor and a 105-cu ft air compressor.

Cheese Cutter—The third component is a cutoff screed which cuts back the settling concrete to a level surface. This consists of a piano wire under tension in an 8-ft tubular frame. It cuts the concrete much like cheese.

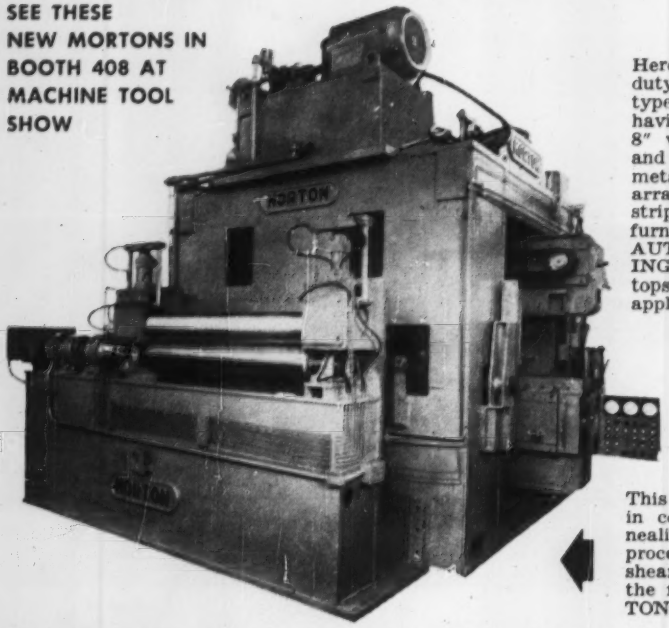
The last major items in the contractor's bag of building tricks are templates which give the finished surface simulated brick and rough stone characteristics. These plates, 3 x 7-ft sheets of galvanized steel, are slotted. By placing them in patterns marked on the wall, a worker can use a tubular thin steel tool to cut through the outer layer of concrete and form deep, raked "mortar" joints that characterize conventional stone masonry.

Cost, Time Saver—Interior walls are made similar to the exterior walls except that the fabric is backed up by re-usable plywood forms. Electrical conduits and telephone and television jacks are positioned prior to shot-creting. This method of wall construction cuts from $2 to $6 a square foot from the cost of conventional wall construction in the Washington area. In addition, Mr. Gillespie figures he can "shoot" the basic walls of a three-bedroom house in a day and a half. With this method, a home can be completed and ready for decorating one week after the floor slab is cured. An added advantage is that only the wood trussed roof, covered with asphalt shingles, is combustible.

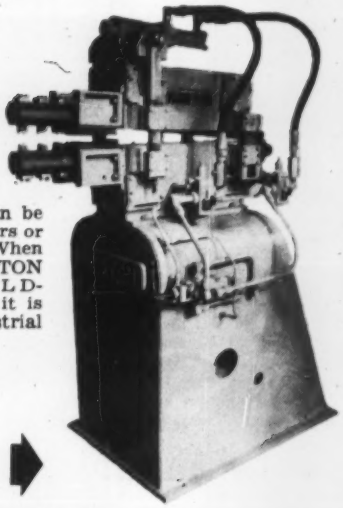
If some practical method can be found to combine this steel-reinforced wall construction with lightweight-steel-beam roof construction (STEEL,

For every metal SHEARING, WELDING, TRIMMING or ROLLING requirement, there is a MORTON....

SEE THESE NEW MORTONS IN BOOTH 408 AT MACHINE TOOL SHOW



Here is a light duty floor or bench type TRIMMER having 4", 6" and 8" width capacity and ⅛" maximum metal thickness. Can be arranged for cylinders or strip trimming. When furnished with MORTON AUTOMATIC WELDING EQUIPMENT it is tops for many industrial applications.



This Model R B is designed for joining the ends of coils in continuous process lines. Galvanizing, pickling, annealing and slitting lines are some of the continuous processes requiring this MORTON equipment. For all shearing, welding, trimming and rolling requirements of the ferrous and nonferrous industries, there is a MORTON machine.

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Stops Losses making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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up to 125-TON CAPACITY

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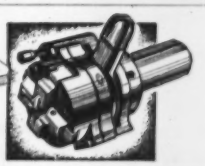

famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

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Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*

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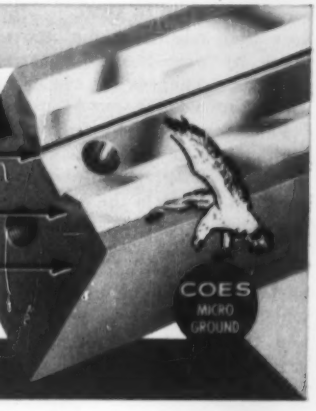

COES KNIFE COMPANY, Worcester, Mass.- Est. 1830

Aug. 22, p. 105) a completely fire resistant home can be built.

Expanding Markets—Wire fabric has been used for many years in commercial and residential building. The Wire Reinforcement Institute Inc., Washington, reports that 50 per cent of the market is in this field, while 25 per cent goes to highway construction and the remainder is used for reinforced concrete pipe. But if this method proves to be acceptable to the homebuyer, it could well increase the market for wire fabric in low-cost housing projects.

Wire . . .

Wire Prices, Pages 270 & 271

Finished wire orders in most categories are heavier for the fourth quarter. Fine wire specialties lag somewhat.

In general, third-quarter carryovers on most active carbon products will not be large or extended, including manufacturers' bright and heading wire. Backlog for highway and building requirements is heavy, but production has been near capacity for some months, and most producers are meeting welded wire fabric and cable demand.

Most production for springs and other automotive needs is for 1956 models, with little or no lag between changes for piston and valve spring stock. There are some inquiries, industrial grades, for first quarter, 1956, but mills are not taking firm orders beyond this year.

In the Chicago district, wiremakers report diminished demand for some merchant wire products, but unchanged to strong demand for manufacturers and construction products. The easier situation in merchant products is entirely seasonal, with an upturn expected in such items as fencing and barbed wire as soon as farmers free themselves from harvesting. Demand is good for concrete pipe reinforcement and nails.

New Tin Mill Product Prices

Mill price bases for electrolytic and hot-dipped tin plate, black plate and terne plate will be increased for the Oct. 1, 1955, through Mar. 31, 1956 pricing period. The new mill price bases, announced by United States Steel Corp. and its general operating divisions, Columbia-Geneva Steel Division and Tennessee Coal & Iron Division, represent an increase of 40 cents per base box, except for special coated manufacturing terne plate. It is being advanced 75 cents per base box. The over-all effect is an average increase for tin mill products of about 5.5 per cent.

Current prices have been in effect since Oct. 1, 1954.

Sets Shell Steel Base Price

Republic Steel Corp. has established a base price of $101.50 per net ton on basic open-hearth carbon shell steel, round corner square sections. A list of extras has been issued, covering size, length and cutting, quantity, chemical requirements, carbon and manganese extras. This product was covered previously in Republic's list of extras on forging quality semi-finished carbon steel.

New Stainless Steel Prices

United States Steel Corp. has established mill price bases for stainless steels of types 201 (USS 17-4-6) and 202 (USS 18-5-8), effective Aug. 24. These types, not produced in recent years, are alternate grades for higher nickel-bearing types 301 and 302. Prices range from ¾ to 2 cents per pound below prices of types 301 and 302, depending upon the product.

In addition, mill price bases are changed for type 442 (USS 21), a straight chrome grade of stainless

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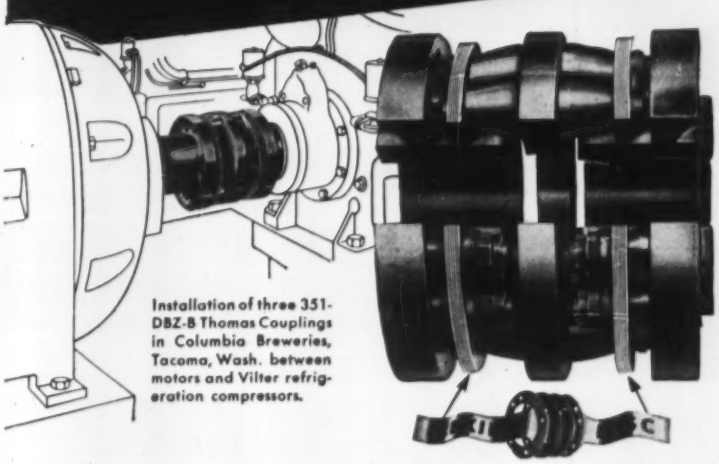
for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.

Write for our new Engineering Catalog No. 51A

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Made with inserted blades, all drop-forged of selected steels.

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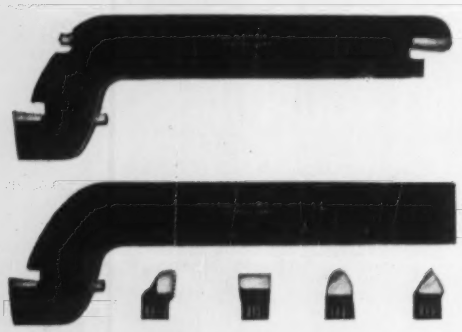
See APEX at Booth 855, The Production Engineering Show, Navy Pier, Chicago, September 6-16, 1955



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FLOOR to FLOOR CONVEYOR

Easy to Install FOR ECONOMICAL HANDLING of BAGS BOXES TRAYS CARTONS CRATES WORK-PIECES ETC.

USED — Floor-to-Floor Over Doors Short units as Booster in Gravity line

Can be used with power or gravity lines. Standard O.A. widths 18"; 22"; 30" — Belt widths 12", 16", 24. Length as required. Top quality 3-ply 28-oz. duck with thick traction rubber-top belt. Reversible direction of travel. Power tail and nose-over available as illustrated.

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MFRS. OF WHEEL & ROLLER GRAVITY & LIVE ROLLER CONVEYORS • POWER BELT CONVEYORS • SWITCHES • ACCESSORIES & REEL DOLLIES

GRAND RAPIDS 4, MICH.

steel previously produced in only limited volume.

Downward revisions, ranging from 1.75 cents to 8.50 cents per pound, are being made in mill price bases for types 347 and 348 (columbium bearing grades) to reflect recent reductions in certain raw materials used in the production of these types of stainless steels.

Downward revisions also are effected in certain mill price bases for types 302B, 304L, 305 and 316L to meet competition.

Minor changes in extras are being made effective on the same date.

Steel Bars . . .

Bar Prices, Page 268

Many producers are oversold on hot-rolled and cold-rolled bars.

Open hot-rolled bar capacity for the balance of this year has narrowed to spot openings. Most of the hot-rolled bar capacity left for fourth quarter is reserved.

Producers are accepting only part of the volume requested by consumers, rejecting a considerable tonnage. They are readjusting order books in many instances to help customers confronted with acute shortages. Carry-overs into the fourth quarter will be at least one month in carbon grades.

J&L To Build Bar Mill

Jones & Laughlin Steel Corp., Pittsburgh, announces the purchase of a 31-acre site at Willimantic, Conn., for construction of a plant to produce cold-finished bars. Hot-rolled bars will be shipped in from its mills in Pittsburgh.

The new plant is not included in the $135 million set aside for expansion and improvement in 1955-56. It will be in operation in 1956.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 269 & 270

As mill output of steel falls below third-quarter estimates, because of hot weather in the Midwest and floods in the East, sheet producers are carefully limiting their fourth-quarter delivery promises. They are falling further behind in deliveries, with the lag ranging up to ten weeks. They are receiving a steady flow of new inquiries.

With mills sold out through this year, sheets will continue in tight supply regardless of buying by the automotive industry. Enough tonnage has been booked, or requested, to balance any decline in auto requirements.

In addition to cold-rolled carbon sheets, most specialties are sold through this year. What is left in hot rolled is small. Some narrow strip can be worked into the fourth quarter—less in high than in low carbon. Some mills are so far behind on carbon and specialty sheets, orders originally booked for June shipment are in rolling schedules.

The government's grain bin building program is taking increased tonnage of galvanized sheets, aggravating tightness in that product. The government has awarded contracts for 18,000 bins, representing requirements for close to 30,000 tons of galvanized material.

Plates . . .

Plate Prices, Page 268

Floods in eastern Pennsylvania hit one of the largest suppliers of plate in the East. With deliveries curtailed, the plate shortage is growing more acute. Pending orders for flood-damage repairs, coupled with a steady influx of railroad orders and a lesser increase in orders from shipbuilders, tightens the market. Nearly all other buyers are increasing their orders: Tank, fabricated plate and pipe requirements are gaining.

Bulk of plate orders are accepted

Cowles Ty-Bond

the first new zinc phosphate coatings in twenty years!

Cowles TY-BONDS . . . amorphous and non-sludging . . . are *not* revisions of old-type coatings. They are completely new coatings—completely new formulations.

Cowles TY-BONDS form tight, hard, clean coatings . . . even the most severe bending, flexing or twisting cannot remove TY-BONDS. They cover the metal completely, no pin-points of metal are left unprotected. Old-type coatings leave as much as 60% exposed to corrosion!

Cowles TY-BONDS are economical because they are non-sludging. There is remarkably little waste . . . more than 90% goes into the surface treatment. TY-BONDS save time by reducing coating cycles and tank clean-outs, and meet all government specifications.

Your Cowles Technical Representative will be happy to give you complete information on the uses and applications of Cowles TY-BOND zinc phosphate coatings. Write or call today.

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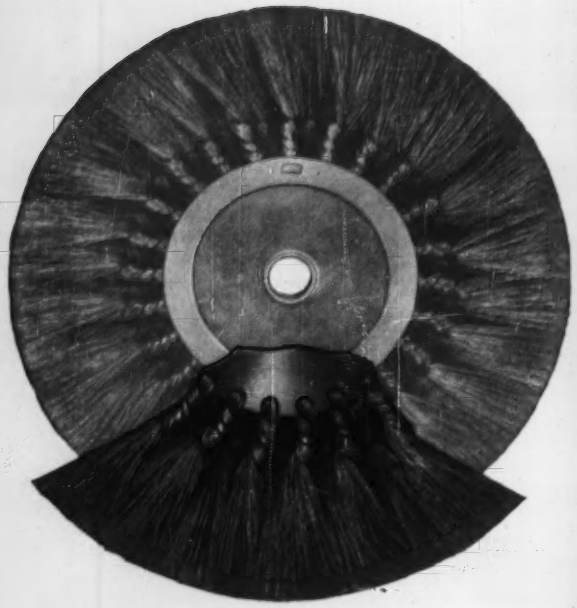


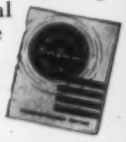
How Pittsburgh knotted brush construction provides

- *Better Balance*
- *Uniform wear*
- *Better cleaning*
- *Longer equipment life*

Because of their construction, Pittsburgh "Lightning" knotted sections have *exactly the same number of wires in every knot.* As a result, you get a brush with perfect balance—one that will wear uniformly and cause less bearing—destroying vibration in the machine that drives it!

What's more, the special type of wire used in these knots is the fastest cutting, with the longest life, that can be produced. Built for the toughest applications, "Lightning" brushes are perfect for cleaning welds, removing scale or rubber, or cleaning parts where penetration brushing is needed.

This is just one example of superior Pittsburgh construction, engineered for both general and specific applications. For details of the complete line, write for free Catalog No. 54-W. Address: PITTSBURGH PLATE GLASS CO., *Brush Division,* Dept. O-08, 3221 Frederick Ave., Baltimore 29, Maryland.



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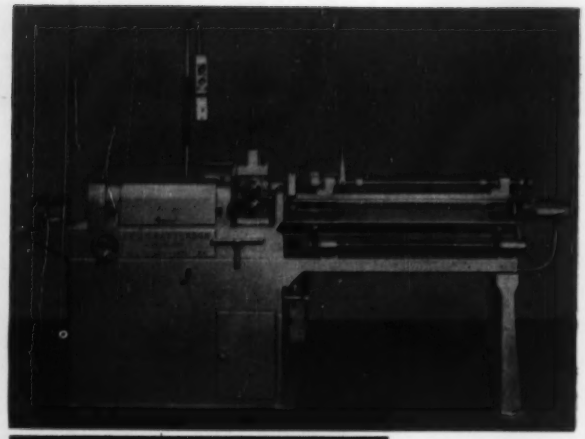

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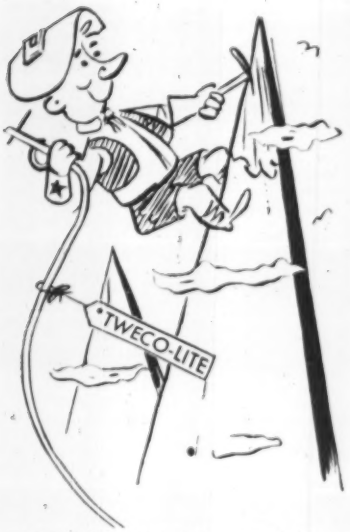

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on a month-to-month basis. Producers with open capacity this year are in November, but easily could close their books for the balance of the year. Many plate inquiries are turned back, or sharply cut back where firm orders are booked.

Railroad carbuilding shops are scheduled to get more plates next quarter, but not enough to meet their scheduled deliveries of rolling equipment. Start of delivery on numerous locomotive and car contracts indicates work was placed contingent on obtaining plates from September and beyond. All this steel may not be available to meet scheduled deliveries, but tonnage will hurt other plate fabricators with smaller volume.

One or two small eastern mills are offering to carry out conversion of semifinished steel to plate at premium prices. Some attempts at conversion deals have been made by Pittsburgh area fabricators, but only on a small scale.

Prices Unchanged

Stainless steel, clad steel, tool steel, pipe and ferroalloy prices remain unchanged. Current price schedules on these products were published in full on pages 102 and 111 in the Aug. 22 issue of STEEL.

Semifinished Steel . . .

Semifinished Prices, Page 268

Sharon Steel Corp. shut down its blooming and bar mill and two electric furnaces last Wednesday at its Lowellville, O., plant for major repairs to the blooming mill motors. Resumption is scheduled for Sept. 6.

Tubular Goods . . .

"We have a good order book, with an ample backlog, and should be able to operate at top performance for the remainder of the year," says a major pipe producer in the Pittsburgh district.

The keeping of shipping promises is of prime importance. Some suppliers of semifinished steel have been running behind schedule, delaying delivery of the finished product.

Tubemakers expect to work at capacity on oil country goods. Demand for pipe is keeping pace with drilling and exploration, which are about 5 per cent ahead of the 1954 pace. Offshore drilling is more active, taking more steel per rig.

Pipe and tubular products for refining installations are close to record peak. For transportation, pipe line expenditures may not reach the high rate attained several years ago,

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and STUDS
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40 years' experience in making special bolts, studs, nuts for specific job requirements.

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STEEL CORPORATION
WORKING IN
STEEL, ALUMINUM
MAGNESIUM, FIBERGLASS

REPRESENTATION IN PRINCIPAL CITIES

but will exceed 1954's by about 5 per cent.

In terms of steel, the petroleum industry will take at least 7.8 per cent of total production this year. Large tonnages of steel pipe are being bought for the American Oil Co.'s refinery at Yorktown, Va.

Continued high demand for steel pipe has resulted in a stepped-up production schedule at Wheeling Steel Corp.'s Benwood, W. Va., plant. The two continuous buttweld furnaces, which produce steel pipe in diameters from ½ to 4 in., have been put on a working schedule of six days a week. Company executives expect production in their steel producing plants to continue at or near capacity for the next several months.

Structural Shapes . . .

Structural Shape Prices, Page 268

How much structural tonnage will be available to fabricating shops in the last two months of this year depends on the backlog and delivery situation by October. It is widely accepted that demand is well in excess of supply and that volume will be cutback.

One of the major producing mills in the Pittsburgh area is telling its customers that structurals they expect to receive in October won't be delivered until November. The situation is growing more acute in practically all districts. Tonnages required for property destroyed and damaged by floods in the East, coupled with large construction and shipbuilding requirements, are exerting tremendous pressure on producers.

Some production was lost as the result of the floods, and an emergency directive for replacement of lost bridges in the East is possible.

Slight, if any, gain is being made against backlogs, notably wide flanged. A large volume of fabricated steel is out for estimates for which plain material will not be available this year. Prices of fabricated structural steel are stronger.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2200 tons, addition, North Haven, Conn., plant, Pratt & Whitney Division, United Aircraft Corp., to Harris Structural Steel Co., New York.

1025 tons, steel H-piles, delivery to Norwalk, Stratford, Branford and Lisbon, Conn., to Bethlehem Steel Co., Bethlehem, Pa., $114,007.73, bids direct to state highway department, Hartford, Aug. 1.

415 tons, girder bridge, Columbia county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa., through A. C. Hack & Sons Inc., Bloomsburg, Pa., general contractor.

400 tons, senior high school, New Canaan, Conn., to Leake & Nelson Co., Bridgeport, Conn., through Monaco Construction Co., Bridgeport, general contractor.

275 tons, bridge, Reading Railroad, Nicetown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

4000 tons, DeKalb avenue subway section, Brooklyn, N. Y., Board of Transportation, New York; rebids in.

3200 tons, grade crossing elimination over Boston & Maine railroad, partly tunnel; Farina Bros. Inc., Newton, Mass., low, general contract, $5,469,289.

2325 tons, overpassing and underpassing structures, Greenwich-Killingly expressway, Milford, Conn.; bids Sept. 12, Hartford.

2305 tons, bridge superstructure, 905-ft welded plate girder, Norwalk, Conn., Greenwich-Killingly expressway; bids Sept. 19, Hartford.

1000 tons, power plant addition, New York; bids in to Board of Transportation.

965 tons, including 600 tons of manganese steel, bridge, Scranton-South Abington township, Pennsylvania; bids Sept. 1, Pennsylvania Turnpike Commission, Harrisburg.

700 tons, addition, St. Luke's Hospital, New York; bids in.

645 tons, bridge, Fox Point interchange, Providence, R. I.; M. A. Gammino Construction Co., Providence, low, general contract.

500 tons, store, Sears Roebuck & Co., Reading, Pa.

550 tons, separation structures, Walt Whitman bridge, Philadelphia approaches; bids Sept 15, Delaware River Port Authority, Camden N. J.

225 tons, grade separation, Greenwich-Killingly expressway, East avenue, Norwalk, Conn.; bids Sept. 12, Hartford. This contract also includes substructure, 905-ft welded girder bridge, Norwalk river, abutments and six piers.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1155 tons, five bridges, Massachusetts turnpike, Chicopee, Mass., to U. S. Steel Supply Division, United States Steel Corp., Boston.

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CLEVELAND, OHIO
WE ARE PROUD TO HAVE SERVED THE
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FROM 1 OUNCE TO 10,000 POUNDS
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through L. G. de Falice & Son Inc., New Haven, Conn., general contractor; also, 22,500 linear feet of steel sheet piling, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, senior high school, New Canaan, Conn., to Fireproof Products Corp., New York, through Monaco Construction Co., Bridgeport, Conn., general contractor.

REINFORCING BARS PENDING

5910 tons, also 5650 tons of steel sheet piling, Wesley E. Seale dam; bids Oct. 11, Lower Neuces River Water Supply District, Corpus Christi, Tex.

800 tons, bridge, Fox Point interchange, Providence, R. I.; M. A. Gammino Construction Co., Providence, low, general contract.

485 tons, deck, Sakonnet river bridge, Portsmouth-Tiverton, R. I.; General Engineering & Contracting Co., Providence, R. I., low, general contract.

485 tons, deck and abutments, bridge, Portsmouth-Tiverton, R. I.; General Engineering & Contracting Co., Providence, R. I., low, general contract.

420 tons, bridge and highway, Scranton-South Abington township, Pennsylvania; bids Sept. 1, Pennsylvania Turnpike Commission, Harrisburg.

335 tons, reinforced concrete highway, Elk county, Pennsylvania; bids Sept. 9, Harrisburg.

100 tons, general stores supply office, Navy, Philadelphia; bids Aug. 30.

PLATES . . .

PLATES PENDING

890 tons, hull, Navy; bids to general stores supply office, Philadelphia.

285 tons, heat-treated alloy plate, Navy, general stores supply office, Philadelphia.

250 tons, steel tanks, bulk fuel storage, Air Force base Dow Field, Bangor, Me.; bids Sept. 7, Corps of Engineers, Boston.

200 tons, six 50,000-gal fuel storage tanks, Abilene Air Force base, Texas; bids Sept. 14, Corps of Engineers, Ft. Worth, Tex.

200 tons, 72-in. diameter pipe, $\frac{5}{8}$-in. plates, outlet pipe, Tiber dam, Missouri river basin project, Montana; bids Sept. 1, Bureau of Reclamation, Denver.

175 tons, boiler, marine; general stores supply office, Philadelphia.

150 tons, 10,000-bbl floating roof tank, also 12,000 linear ft, 4-in. steel pipe, Ramey Air Force base, Puerto Rico; bids Sept. 20, Corps of Engineers, Jacksonville, Fla.

115 tons, 125-ft elevated steel water tank, Iroquois village, Ont., St. Lawrence power project; bids in.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Manila Railroad (Philippines), thirty 1200-hp diesel-electric and ten 500-hp diesel-electric switchers, to International General Electric Co., Schenectady, N. Y.

Savannah & Atlanta, one 1600-hp general purpose diesel, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

The Virginian, twelve 3300-hp, 197-ton ignition rectifier-type locomotives, to General Electric Co., Schenectady, N. Y.

Western Pacific, eight 1750-hp general purpose diesels, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Canadian Pacific, three self-propelled diesel cars, to The Budd Co., Philadelphia.

New York, Chicago & St. Louis, 500 all-steel 50-ton boxcars, to General American Transportation Corp., Chicago.

Richmond, Fredericksburg & Potomac, two lightweight stainless steel coaches, to Pullman-Standard Car Mfg. Co., Chicago.

Southern Pacific, 2350 boxcars, 275 seventy-ton hoppers and 100 fifty-ton flat cars or pulpwood cars, to own shops, Sacramento, Calif., and Houston.

Union Pacific, 50 seventy-ton covered hoppers to General American Transportation Co., Chicago; also 200 boxcars and 300 automobile boxcars to own shops.

RAILROAD CARS PENDING

General Services Administration, Washington, 50 seventy-ton flats, for common carrier and piggyback service.

Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hemanite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$33.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 95c-$1.05 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	32.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

56-60%	$3.50-$3.75
60-65%	3.75-3.90

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $125; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $244.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett, Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Cincinnati, deld.	27.10
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 14.00; Grade 2-3, 13.50; Grade 4, 15.50; Grade 5, 14.25

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, duty paid, metallurgical grade: European, $31-$33; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam, Inches	Length	Per 100 lb
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5¼	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25

CARBON

8	60	11.40
14, 12, 10	60	11.10
14	72	10.25
17	60	10.25
17	72	9.85
20	84	9.85
20	90	9.65
24	72, 84	9.85
24	96	9.60
30	84	9.75
40, 35	110	9.50
40	100	9.50

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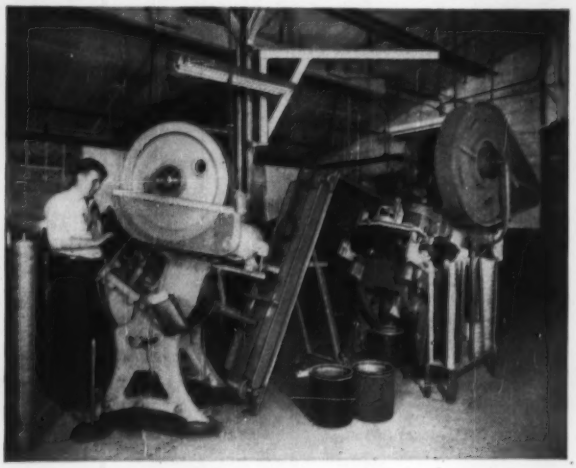

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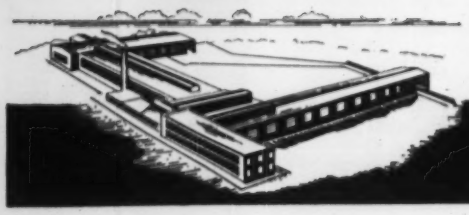

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SPRING CITY PENNSYLVANIA

Scrap . . .

Scrap Prices, Page 286

Pittsburgh—Prices were indefinite last week due to an absence of mill buying. The largest scrap buyer in this district plans to make a sizable purchase soon. This has given rise to conflicting reports on the strength of the market. Generally, it's felt that the price rise has reached its peak. Stainless steel scrap quotations continue to climb.

Chicago—The scrap market here gives further evidence of stabilization at present levels. A large but orderly volume of scrap is moving. Scrap production is increasing, too, with manufacturing plants having fairly well completed vacation shutdowns.

The recent mild decline in scrap prices is not considered as the start of a trend, but rather a leveling-off action. Prospects of a high steelmaking rate during the remainder of the year provides assurance of heavy scrap consumption and a reasonable degree of price stability at the level attained following the July advance in steel prices.

Cleveland—The scrap market remained firm here last week, with prices unchanged. The trade was awaiting the closing of industrial lists later in the period and early this week for a reliable test of the market. Brokers are optimistic because of prospects for a high steelmaking rate over the balance of this year.

Philadelphia—Steel scrap prices have leveled off, indicating that the upward movement has been halted. Cast scrap and specialty grades also are unchanged.

One boat load of steel scrap for export has been sold at the prevailing domestic price level, dock. Recent strength eliminated premiums on export steel scrap tonnages.

New York—Steel scrap prices are unchanged. The upward trend has leveled also on cast iron grades. The movement of scrap to eastern Pennsylvania continues at a substantial rate against old orders.

Buffalo — Scrap market here is slightly easier on lack of mill buying. Dealers have no difficulty finding sufficient material to cover contracts.

St. Louis—Sale of more than 6500 tons of scrap by two railroads failed to weaken the market. Prices of No. 1 heavy melting and rerolling rails advanced $1 a ton. Dealer scrap prices are steady.

Birmingham—No price change was posted on open-hearth grades last week in this district. However, both dealers and brokers feel that the two major consumers in the area will be coming into the market soon with higher prices than those paid last. The expected increase in prices will be due mainly to a stronger export market which is continually drawing scrap from towns that had been serving domestic mills.

Iron Ore . . .

Iron Ore Prices, Page 283

Consumption of Lake Superior iron ore in the United States was over 40 per cent larger in July than in the like month a year ago—6,903,008 versus 4,892,812 tons. The June figure, 7,087,599 tons, put the total for the first seven months at 47,805,505 tons, compared with 38,026,983 tons in the like 1954 period.

On Aug. 1, 179 furnaces were in blast in the U. S. while 13 were idle, showing a sharp improvement over a year ago when 124 were in blast and 66 were idle.

Due to the high rate of consumption, accumulation of stocks for the winter months is proceeding slowly. As of Aug. 1, U. S. stocks came to 31,829,330 tons, a gain of 5,631,201

(*Please turn to page* 288)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 24	$44.33
Aug. 17	44.33*
July Avg.	39.67
Aug. 1954	28.80
Aug. 1950	40.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania. *Revised.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 1 bundles	44.00-45.00
No. 2 bundles	36.00-37.00
No. 1 busheling	44.00-45.00
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Cut structurals, 3 ft lengths	48.00-49.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	48.00-49.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	35.00-36.00
Heavy breakable cast	35.00-36.00
Unstripped motor blocks	25.00-26.00
No. 1 machinery cast	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00
Rails, 2 ft and under	53.00-54.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	50.00-51.00
Railroad specialties	52.00-53.00

Stainless Steel Scrap

18-8 bundles & solids	*265.00-275.00*
18-8 turnings	*120.00-130.00*
430 bundles & solids	100.00-105.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer's plant)

No. 1 heavy melting	43.50-44.50
No. 2 heavy melting	32.00-33.00
No. 1 bundles	43.50-44.50
No. 2 bundles	29.00-30.00
No. 1 busheling	43.50-44.50
Machine shop turnings	23.00-24.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	27.00-28.00
Cast iron borings	27.00-28.00
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	48.00-49.00
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	43.50-44.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	51.00-52.00
Rails, 2 ft and under	54.00-55.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	49.00-50.00
Cast steel	46.00-47.00
Railroad specialties	52.00-53.00
Uncut tires	47.00-48.00
Angles, splice bars	53.50-54.50
Rails, rerolling	60.00-61.00

Stainless Steel

(Brakers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	275.00-280.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	46.00-47.00
No. 2 bundles	32.00-33.00
No. 1 busheling	46.00-47.00
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	46.00-47.00
Electric furnace bundles	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00

CHICAGO

No. 1 heavy melting	41.00-43.00
No. 2 heavy melting	*33.00-34.00*
No. 1 factory bundles	43.00-44.00
No. 1 dealer bundles	40.00-41.00
No. 2 bundles	31.00-32.00
No. 1 busheling	41.00-43.00
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	*45.00-46.00*
Punchings & plate scrap	*46.00-47.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	*36.00-37.00*
Unstripped motor blocks	32.00-33.00
Clean auto cast	50.00-51.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00-46.00*
R.R. malleable	51.00-52.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Angles, splice bars	53.00-54.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	265.00-275.00
18-8 turnings	140.00-150.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange
(Week ended Aug. 24)

	No. 1 Heavy Melting High	Low	Close
Oct.	....	....	39.00*
Jan.	....	....	....

Sales (160-ton units): None.
*Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	39.00
No. 2 heavy melting	29.00
No. 1 bundles	39.00
No. 2 bundles	27.00
No. 1 busheling	39.00
Machine shop turnings	21.00
Mixed borings, turnings	21.00
Short shovel turnings	23.00
Punchings & plate scrap	44.00

Cast Iron Grades

Charging box cast	32.00
No. 1 cupola	39.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	42.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	32.00-33.00
No. 2 bundles	24.00-25.00
No. 1 busheling	32.00-33.00
Cast iron borings	15.00-16.00
Short shovel turnings	*25.00-26.00*
Machine shop turnings	19.00-20.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	46.00-47.00
Stove plate	43.00-44.00
Bar crops and plate*	40.00-41.00
Structural plate, 2 ft	39.00-40.00
Unstripped motor blocks	35.00-36.00
Charging box cast	27.00-28.00
No. 1 wheels	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	44.00-45.00
Rails, 18 in. and under	*50.00-51.00*
Rails, rerolling	53.00-54.00
Rails, random lengths	*45.00-46.00*
Angles, splice bars	*45.00-46.00*

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	46.00-47.00†
No. 2 heavy melting	40.00-41.00
No. 1 bundles	46.00-47.00†
No. 2 bundles	36.00-37.00
No. 1 busheling	46.00-47.00
Electric furnace bundles	47.50
Machine shop turnings	28.00-28.50
Mixed borings, turnings	27.00-28.00
Short shovel turnings	30.50-31.00
Structurals & plate	48.00-49.00
Heavy turnings	42.00
Couplers, springs, wheels	50.00
Rail crops, 2 ft & under	54.00

Cast Iron Grades

No. 1 cupola	36.00-38.50
Malleable	50.00
Heavy breakable cast	45.00
Drop broken machinery	47.00

†Revised, effective Aug. 16.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	40.00-41.00
No. 2 bundles	31.00-32.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	19.50-20.00
Short shovel turnings	22.00-23.00
Low phos. (structural & plate)	42.00

Cast Iron Grades

No. 1 cupola	33.00-34.00
Unstripped motor blocks	24.00-25.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	270.00-275.00
18-8 borings, turnings	135.00-140.00
430 sheets, clips, solids	115.00-120.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	35.50-36.50
No. 2 bundles	26.50-27.50
Machine shop turnings	17.50-18.00
Mixed borings, turnings	20.50-21.00
Short shovel turnings	22.00-22.50
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

BUFFALO

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	39.00-40.00
No. 2 bundles	33.00-34.00
No. 1 busheling	39.00-40.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	45.00-46.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 2 ft and under	51.00-52.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.50-42.50
No. 2 heavy melting	35.50-36.50
No. 1 bundles	41.50-42.50
No. 2 bundles	33.50-34.50
No. 1 busheling	41.50-42.50
Machine shop turnings	28.00-29.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	31.00-32.00
Cast iron borings	24.00-25.00
Low phos., 18 in.	45.00-46.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	38.00-39.00
Charging box cast	38.00-39.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	45.00-46.00

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.50
No. 2 heavy melting	34.00
No. 1 bundles	36.50
No. 2 bundles	29.50
Machine shop turnings	25.00
Short shovel turnings	27.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	36.00
Clean auto cast	*46.00*
Stove plate	37.00

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00*
Rails, 18 in. and under	52.00
Rails, random lengths	48.00
Rails, rerolling	*62.00*
Angles, splice bars	50.00

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	28.00
No. 2 bundles	23.00
No. 3 bundles	19.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	42.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	38.00
Heavy breakable cast	30.00
Unstripped motor blocks	29.00
No. 1 wheels	30.00-33.00
Stove plate (f.o.b. plant)	25.00
Brake shoes	28.00-29.00

Railroad Scrap
(Delivered consumer's plant)

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
Machine shop turnings	10.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 1 busheling	32.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	14.00
Cast iron borings	14.00
Cut structurals	34.00
Heavy turnings	12.00
Punchings & plate scrap	32.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

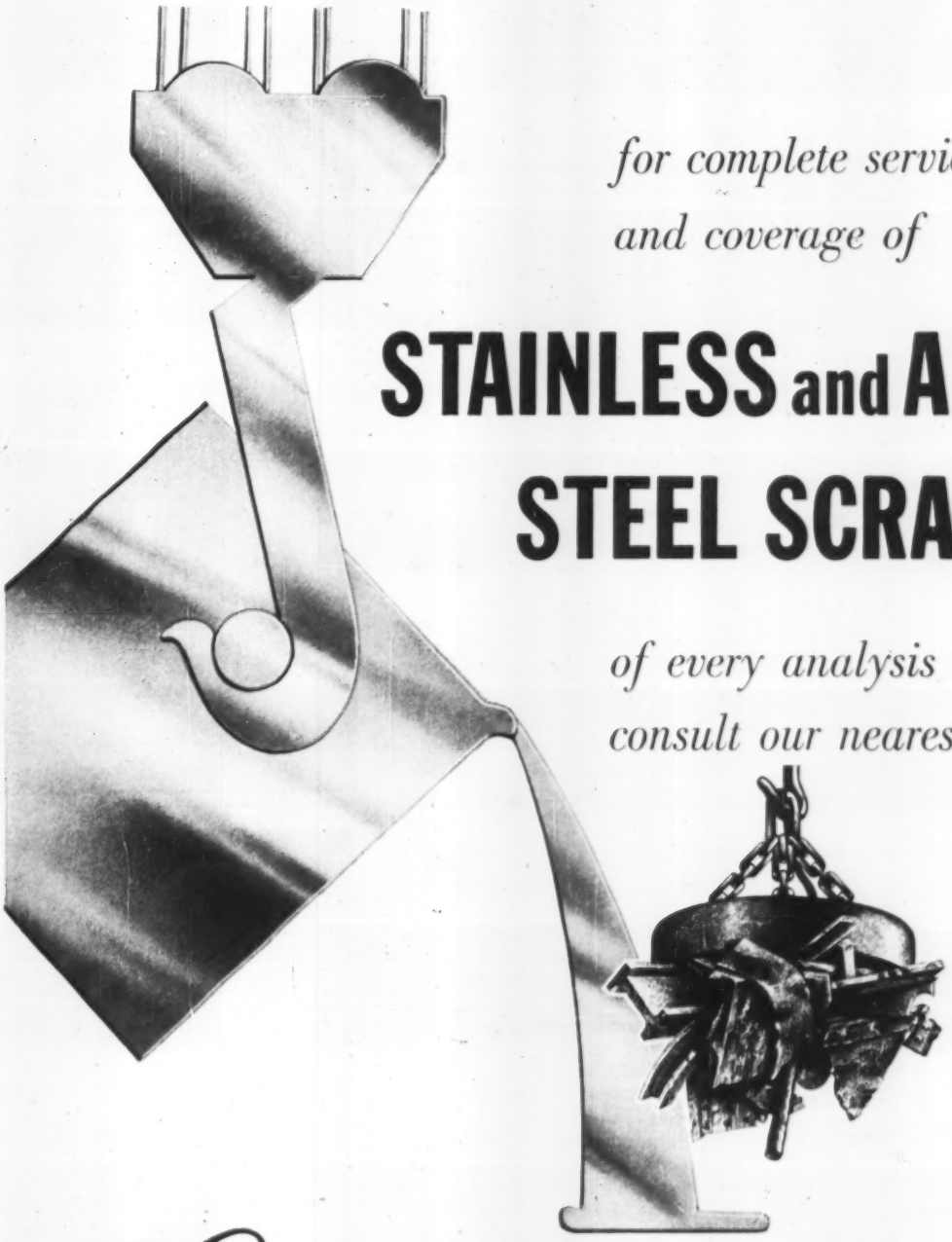
(Delivered prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory: Prepared	36.50
Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



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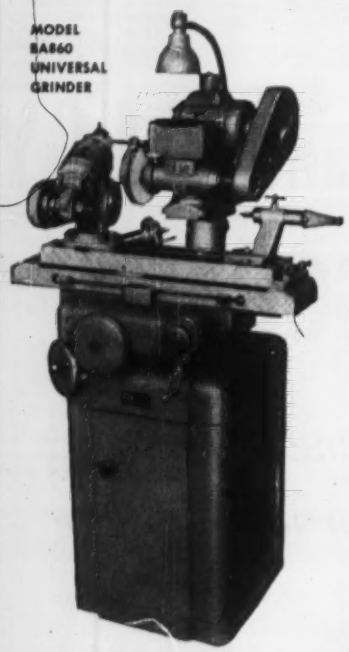

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SEPTEMBER 6-17

—o—

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ABERDEEN, S. DAK.

(*Concluded from page 285*)

tons over July. On Aug. 1 of last year, stocks stood at 38,868,521 tons.

Pig Iron . . .

Pig Iron Prices, Page 272

Activity at foundries is high in all sections. It is at its peak on the West Coast, with all shops operating close to 100 per cent of capacity in the Los Angeles district. More pig iron is being consumed than the most optimistic predicted last spring.

In New England, textile machinery foundries are melting 20 to 25 per cent more iron than they did last year, although they are operating substantially below full capacity. This group is normally the largest iron user in the area.

Blast furnaces operated at slightly under 90 per cent of capacity in July and the first seven months of the year. Production of pig iron amounted to 6,329,393 tons in July and 43,497,887 tons in the first seven months. The output of ferromanganese and spiegeleisen came to 61,166 tons and 376,885 tons, respectively.

Warehouse . . .

Warehouse Prices, Page 272

Demand for warehouse steel products continues brisk, with the pace being set by plates and structurals. Sales are in excess of substantial replacements by the mills, causing a further unbalancing of stocks.

The inventory outlook is not enhanced by setbacks on mill shipments—six to eight weeks on some products. Stocks of sheets, structurals and plates in lighter gages are low. Incomplete size ranges are a problem, but substitutions are being found in many instances.

The familiar cycle (extended mill shipments forcing more volume through warehouses to reduce warehouse inventories) is in full swing. Inquiries are coming from greater distances and beyond areas usually served.

Bookings of stainless steel products generally are well maintained, with inventories in good balance. Business in stainless flat-rolled products is spotty in some districts, but the nickel shortage has extended warehouse buying into the first quarter.

In the Pittsburgh district, distributors are recovering from effects of a truck strike which snagged deliveries. Now their chief difficulty is getting enough structural shapes, plates, sheets and bars to keep stocks in balance. With many mills not taking any more sheet orders this year, the situation will worsen in the fourth quarter.

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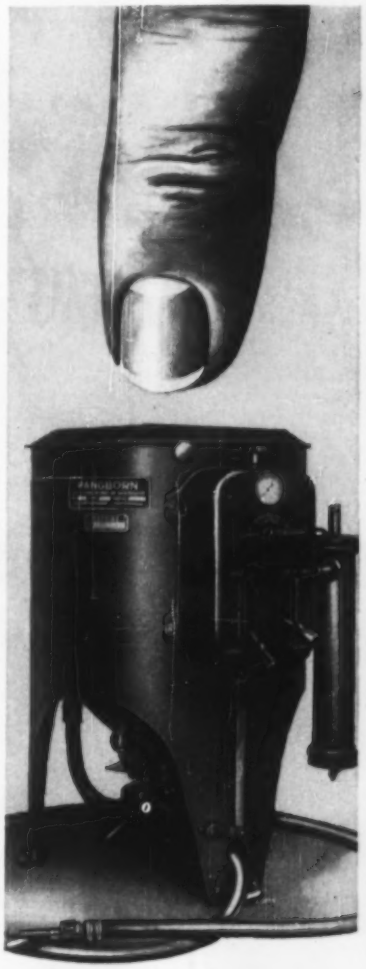

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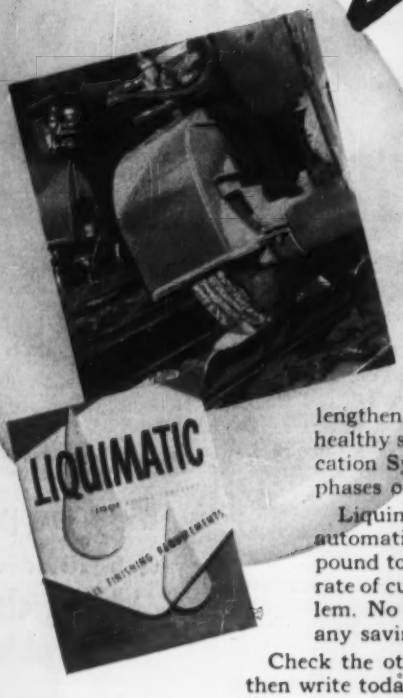

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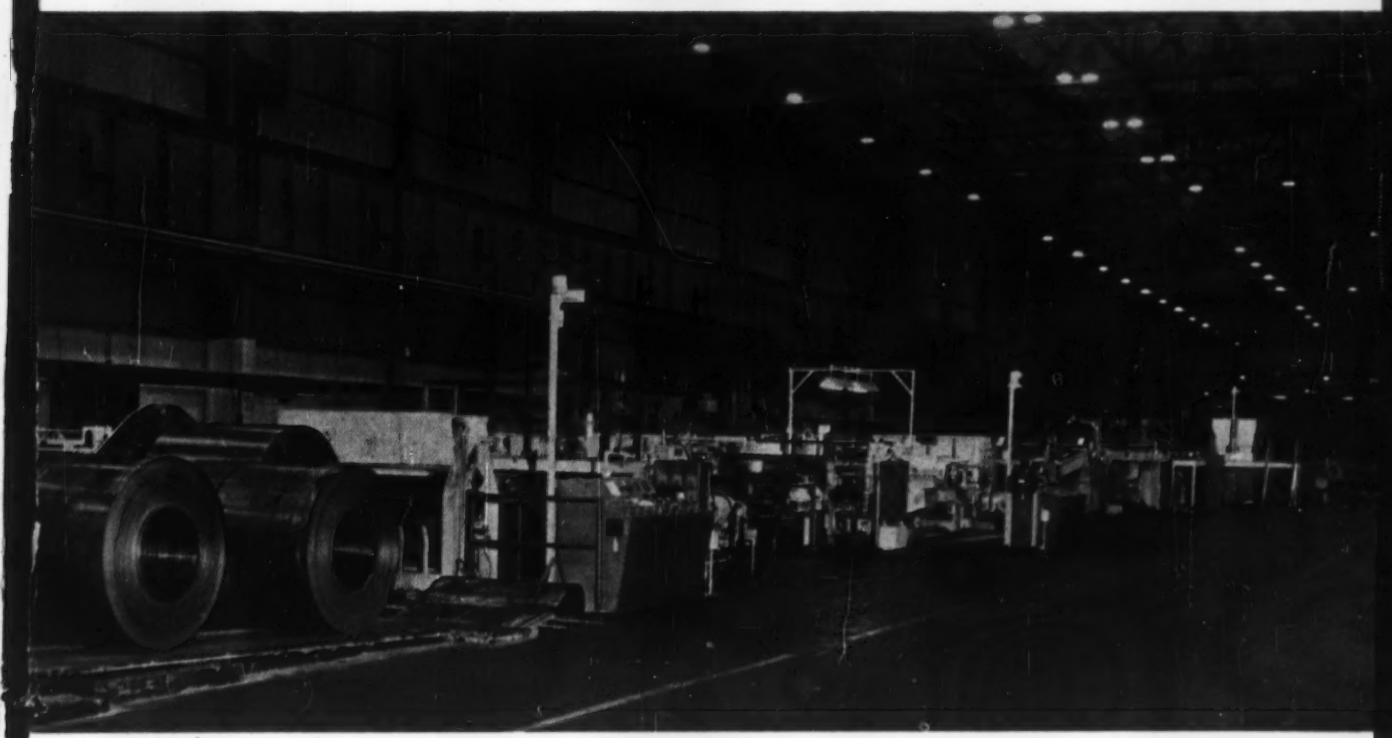
Will you lose out competitively on this big market on poor quality of product or slow production equipment? Good equipment brings down production costs and improves product quality.



Aetna-Standard designs and builds equipment for producing, processing and fabricating steel, copper, brass, aluminum, rubber and plastic. Here is one example—an 80" Sheet Side Trimming and Shearing Line at the Fairless Works, U. S. Steel Corporation. Other Aetna major product lines include: Pipe Mills (Seamless and Butt Weld); Continuous Coating Lines; Rolls; Drawbenches; Machinery for Rubber and Plastic.

SUBSIDIARY and ASSOCIATED COMPANIES

The Aetna-Standard Engineering of Canada, Ltd., Toronto, Ontario, Canada.
The Head Wrightson Machine Company, Ltd., Middlesbrough, Eng.
Societe de Constructions de Montbard, Montbard, France.
Demag Aktiengesellschaft, Duisburg, Germany.
Compagnia Italiana Forme Acciaio, Milano, Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan.
Engineering and Development Corporation of the Philippines, Manila, P. I.
Hale and Kuliqren, Inc., Akron, Ohio.
M. Castellvi, Inc., New York, N. Y.
Standard Engineering Co., Ellwood City, Pa.
Trans-World Traders, Inc., Pittsburgh, Pa.

Designers and Builders to the Steel, Copper, Brass, Aluminum, Rubber, Plastic and Chemical Industries

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

TIMKEN® bearings eliminate chatter on fast cutoff machines

TAYLOR-WILSON cutoff machines are designed for high-speed crop ending of pipe up to 26" O.D. This calls for carboloy tools and high speeds.

Previous machines could not be run at the desired high speeds because of tool chatter. That meant losing the production advantages of carboloy tools.

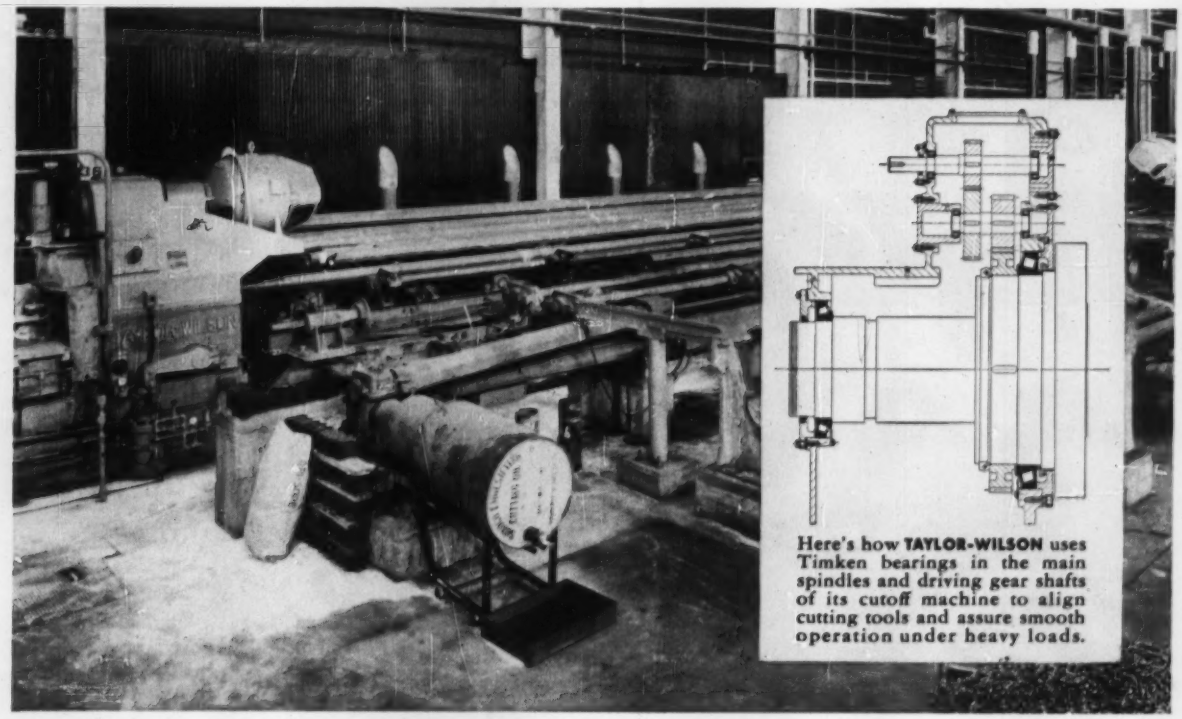
Taylor-Wilson engineers solved the problem by switching to Timken® tapered roller bearings in the main spindles and drive gear shafts. In spite of high pressures on the tools, Timken bearings keep the shafts in perfect alignment, assuring smoother operation. Result: machines operate at maximum r.p.m. and, most important, there's no chatter. Bearings last longer and adjacent parts require a minimum of maintenance.

Because Timken bearings are tapered, they take radial and thrust loads in any combination. No thrust bearings are needed. And full line contact between rollers and races gives them extra load-carrying capacity. Valuable space is saved because Timken bearings are so compact they permit highest load-carrying capacity in smallest space.

Wear is held to a minimum because Timken bearings practically eliminate friction. They're designed to have true rolling motion. And they're made microscopically accurate to conform to their design. To insure their quality every step of the way, we make our own fine alloy steel. We're the only bearing maker in America that does. And we make it nickel-rich for added toughness.

You can have all these advantages in the equipment you build or buy if you specify Timken bearings. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



Here's how **TAYLOR-WILSON** uses Timken bearings in the main spindles and driving gear shafts of its cutoff machine to align cutting tools and assure smooth operation under heavy loads.

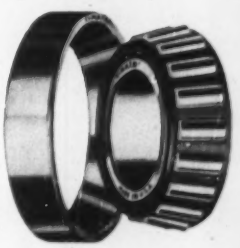
DON'T MISS THE TIMKEN BEARING DISPLAY

You'll want to see The Timken Roller Bearing Company display at the Production Engineering Show, booths 425 and 426, September 6 through 16, Navy Pier, Chicago.

TIMKEN

REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION ✳